Railway Age Gazette

PUBLISHED EVERY FRIDAY AND DAILY EIGHT TIMES IN JUNE BY THE
SIMMONS-BOARDMAN PUBLISHING COMPANY
WOOLWORTH BUILDING, NEW YORK.

CHICAGO: Transportation Bldg. CLEVELAND: Citizens' Bldg.
LONDON: Queen Anne's Chambers, Westminster.

E. A. SIMMONS, *President.*
L. B. SHERMAN, *Vice President.* HENRY LEE, *Sec'y & Treas.*
The address of the company is the address of the officers.

EDITORS
SAMUEL O. DUNN, *Editor*
ROY V. WRIGHT, *Managing Editor*

W. E. HOOPER	H. F. LANE	C. W. FOSS
B. B. ADAMS	R. E. THAYER	F. W. KRAEGER
E. T. HOWSON	A. C. LOUDON	K. L. VAN AUKEN
H. H. SIMMONS	C. B. PECK	J. M. RUTHERFORD

Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico	$5.00
Canada	6.00
Foreign Countries (excepting daily editions)	8.00
Single Copies	15 cents each

Engineering and Maintenance of Way Edition and four Maintenance of Way Convention daily issues, North America, $1; foreign, $2.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

WE GUARANTEE, that of this issue 8,750 copies were printed; that of these 8,750 copies 7,176 were mailed to regular paid subscribers to the weekly edition, 225 were provided for counter and news companies' sales, 1,052 were mailed to advertisers, exchanges and correspondents, and 297 were provided for new subscriptions, samples, copies lost in the mail and office use; that the total copies printed this year to date were 175,100, an average of 9,216 copies a week.

The RAILWAY AGE GAZETTE and all other Simmons-Boardman publications are members of the Audit Bureau of Circulations.

VOLUME 58 MAY 7, 1915 NUMBER 19

Contents

EDITORIAL:
Editorial Notes 957
Award In Engineer's and Firemen's Arbitration 958
Efforts of Train Limit Legislation 958
The Disturbance Over the Western Arbitration 959
LETTERS TO THE EDITOR:
The Trainmaster and the Engine-House Foreman; J. L. Coss 960
Factor of Adhesion in Steam Locomotives; E. F. Given 961
MISCELLANEOUS:
Arbitration Award In Enginemen's Wage Controversy 962
*Careful Loading of Package Freight 965
Where the Delivering Agent Falls Down; D. C. Davis 966
Saving Waste Grain 966
*Reclamation of Scrap on the Great Northern 967
Train Accidents in March 970
*Construction of New Line to Reach Utah Coal Fields 971
Western Rate Advance Hearing 973
The Rivers and Railroads in the United States; F. Lavis 975
*Mikado and Pacific Type Locomotives of Modern Size 976
Premiums For Freight Train Speed 977
The Wabash Reorganization Plan 978
*Lining Tunnels on the New Lewistown-Great Falls Line of the St. Paul 978
Cost of Train Limit Legislation 979
The Golden Rule Applied to Freight Classification 980
GENERAL NEWS SECTION 981

*Illustrated.

Wabash Reorganization Plan

The Wabash reorganization plan, outlined in another column in this issue, is drastic, but whether drastic enough or not only time can show. Stockholders are assessed $30 in cash per share and receive new preferred and common stock to a total par value of the amount of stock which they are surrendering in the case of the preferred, and of 95 per cent of the par value of the stock which they are surrendering in the case of the common. The first and extension mortgage bondholders are exchanging a bond for a preferred stock, and while they are receiving, it is true, stock with a par value 20 per cent greater than the face value of the securities which they are surrendering, they are also surrendering coupons calling for interest payments amounting to about 12 per cent and are compelled to underwrite the $30 assessment on the stock under pain of forfeiture of their equities, with the exception of the very small amount which would probably accrue to them as their pro rata share of the selling price under foreclosure of the property. The interest charges of the new company are but $3,183,915, as against present interest charges, all of which, of course, are not being paid, however, of $5,795,278. In the fiscal year ended June 30, 1914, the property earned a sum available for interest payments of $2,680,975, or an amount less by $502,940 than the sum required for interest under the new plan. Under the plan the new company will have funded debt and equipment trust obligations amounting to $26,000 per mile of road. This is conservative, and if rates and operating conditions are such as to permit of a reasonably low operating ratio, the property ought to show a return on at least the first preferred stock, and in time on the second preferred stock. As will be seen, however, rates and operating conditions in 1914 were not such as to permit even the total interest charges on the funded debt to be earned. The main points about the plan which are notable are the large scaling down in fixed charges, the conservatism with which stock is issued against paper equities surrendered, and the fact that no provision is made for any large amount of money to be spent on additions and betterments to the property, the plan providing but for $3,500,000 working capital for the new company after the payment of receivers' certificates, expenses of reorganization, etc. This is not more than the current necessities of a railroad company and does not allow of any capital expenditures.

The Continental Telegraph Alphabet

A telegraph operator on a prominent western road asks us to advocate the use on railroad wires of the Continental alphabet, in place of the Morse. He calls for the change in the interest of "safety first," for, as everyone admits, there is less liability to error in reading. The Morse operator, like the stenographer, is doing a prodigious amount of guessing, every day, and the wonder is that so very, very few wrong guesses go uncorrected. Besides safety, our correspondent makes a strong plea on the ground of convenience and the lessening of the wear on the nerves, an argument which, he says, is backed up by the cable and wireless operators who use the Continental. On principle, we are disposed to endorse our correspondent's view; but the number of operators who cannot be displaced, yet who could not easily perfect themselves in a new language, make the practical question rather confusing. The writer of these lines has been familiar with the Morse alphabet from boyhood, and he would weep to see it displaced. The sound of "Morse" when sent by some of the renowned old-timers is as pleasant to the ear as the classical verses which were committed to memory in the primary school. In an office where the Continental is used he feels as little at home as he would in the parliament of Norway. But "safety first" does have an application here. The Morse alphabet has a record for safety; but with the Continental the attainment of safety is no doubt much easier. Simplicity tends to safety, and the elimination of the spaced letters and the long dash simplifies the work greatly. Again, there is the question of uniformity. The nations of the world are practically agreed on the Continental for international telegraphing. In despatching, the question may not be of the first importance, for it looks as though everybody would soon be using the telephone; but for long distances the dots and dashes still have a great field of usefulness, and "safety first" has an application even in message work. The Continental is already in use on land lines in this country to a considerable extent, notably on long lines of the Postal Company, and its use is said to be increasing.

Proposed Ohio Legislation

A bill has been introduced in the upper house of the Ohio legislature which, if passed and made effective, would reduce the rate on intrastate shipments of coal in Ohio proportionately to the reduction of the rate from Nelsonville to Toledo from $1 to 75 cents. Regardless of the question of the reasonableness of Ohio intrastate coal rates, this particular piece of state legislation is vicious in principle. In 1910 the Ohio railroad commission ordered the Ohio rates reduced proportionately to a reduction of from $1 to 85 cents in this Nelsonville-Toledo rate. An appeal was made to the courts and the case is now being tried by the Supreme Court of Ohio. To attempt to pass a law which would reduce rates by a substantial amount further even than the state commission reduced them, while the highest state court is engaged in determining the reasonableness of the commission-made rates, is about as indefensible as any state regulation of railroads could be. It is pertinent, moreover, to briefly describe the method used by the Ohio commission in arriving at the 85-cent rate. The cost of service was estimated by the commission, and this was taken as 60 per cent of the total cost, the other 40 per cent taking care of fixed charges, taxes, profits, etc.; but when the commission came to determine the cost of service they divided it into two parts—one the cost of haulage, which they found to be 39.02 cents, and one the terminal cost, which they found to be 20 cents. Instead of adding these two together and then adding two-thirds they added two-thirds to the cost of haulage but nothing to the terminal cost, thus arriving at about 85 cents, whereas if they had followed out their own formula and taken the total cost of service at 59.2 cents, which was what they determined it to be, and added two-thirds, the rate would have been 98.386 cents. It will be remembered that the rate which the commission reduced was $1.

AWARD IN ENGINEERS' AND FIREMEN'S ARBITRATION

THE award made in the arbitration of the demands of the engineers and firemen of western railways is published elsewhere in this issue. As to its effect on existing schedules and conditions it is impossible to make any accurate analysis until it has been applied to the actual operating conditions on each road and until it has been determined in what instances the present rules or rates will be retained by the employees in preference to those granted. Under the "saving clause" of the arbitration agreement any changes in rules or working conditions will result in an increased expense to the railroads.

Apparently a greater increase in the payrolls will be brought about through the operation of the new rules than by the direct increases in wage scales granted. The enginemen's brotherhoods have stated that the increases will amount only to about $1,000,000 a year. The general managers' committee has declined to make any premature estimate.

Some advances in pay are given for the smaller engines, both freight and passenger, but most of the money to be paid out on account of the higher wage scales will go to the engineers and firemen in switching service and to the hostlers, who are given a very substantial increase. In the classification of engines according to the weight on drivers as a basis of compensation the board has followed the eastern award to the firemen, and it is difficult to make any comparison with the present rates because the present classifications on western roads are a mixture of the cylinder dimension and the weight basis and vary greatly on the different roads.

As Messrs. Park and Byram observe in their statement filed with the award, benefits will accrue to the men who are most deserving of more pay and better rules, rather than to the men who are now receiving the highest pay and the most liberal rules.

Whether the award will have any tendency toward standardization will depend on the extent to which the men prefer to retain the present schedule provisions, and they will of course prefer those that give them the most money or which they consider most favorable to them in other ways. But as the railroad arbitrators show, any considerable degree of standardization was impossible under a one-sided agreement which permitted standardization only in an upward direction, by making universal the most favorable rules and rates to be found anywhere, and did not afford any opportunity for an equalization by taking away some rule or rate now in effect to replace it with one that could be uniformly applied. Such a standardization was offered the employees in the counter-proposals of the railroads and was refused because the men preferred to stand for their demand for a pyramiding of the most favorable rates of wage to be found in any schedule upon the most favorable rules in existence.

The award of the board shows that the majority fully recognize the interrelation of rates of wages and rules, and as a result the most unreasonable demands of the men were either denied or so modified that they will not have the cumulative effects on other rates or rules which the subtle wording in which they were submitted would have produced. In other instances, the board recognized that while certain conditions might need correction, in most cases they could be properly adjusted only with reference to local conditions or other special circumstances, and not by a hard and fast rule applying to all roads.

EFFECTS OF TRAIN LIMIT LEGISLATION

PRESIDENT EARLING, of the Chicago, Milwaukee & St. Paul, in a recent statement to the Public Utilities Committee of the Illinois House, presented some statistics regarding the expense to which the St. Paul road would be put in Illinois if the train limit bill pending in the legislature should be passed. The bill in question would prohibit freight trains from containing more than 50 cars. All important railways have invested large sums in grade reductions, long passing tracks, large yards, locomotives of large tractive power, etc., to enable them to handle freight in large train loads and secure the operating economies thus attainable. Mr. Earling's statement regarding the effect the proposed legislation would have on the St. Paul is summarized elsewhere. He shows that it would render valueless an investment in Illinois of $4,091,753. A return of 6 per cent on this would be $245,500 annually. Beside rendering this investment valueless the legislation, Mr. Earling shows, would cause an increase in the operating expenses of the St. Paul in Illinois of $441,155. The loss per annum on investments rendered valueless and in increased operating expenses would therefore be $687,000.

The mileage of the St. Paul in Illinois is 415 miles, and therefore its loss per mile would be $1,654. The total railway mileage of the state on June 30, 1913, was 12,013. If the total loss per mile on all the railways would be as great as Mr. Earling estimated it would be on the St. Paul, the proposed legislation would cost the railways of the state almost $20,000,000 a year. This estimate of the total cost in Illinois is, of course, a rough approximation, but it gives a clew to the enormous increased burden that would be put on the railways directly and on the public indirectly.

Limitation of the length of freight trains is advocated in the interest of public safety. Those who are seeking it claim that it would reduce railway accidents. If it would reduce railway accidents to any considerable extent it might be desirable in spite of the increase in expenses it would cause. But as a matter of fact, the proposed reduction of the length of trains would not reduce accidents. It would be certain to increase them. If the length of trains was reduced this would obviously make it necessary to run more trains in order to handle the business. But past experience shows that the

most certain way to increase railway accidents is to increase the number of trains run under any given set of conditions. Furthermore, the statistics show that there is a closer relationship between the number of accidents and the number of freight trains run than there is between the number of accidents and the number of passenger trains run. A careful analysis of the statistics for the period from 1903 to 1914 shows that during this period in 90 per cent of the cases when there was an increase in freight train mileage there was an increase in the number of accidents of all kinds, and when there was a decrease in freight train mileage there was a decrease in accidents of all kinds. The following table gives the freight train miles per year during this period and the number of all classes of persons killed and injured in accidents resulting from the movement of trains.

CASUALTIES TO ALL PERSONS—ACCIDENTS RESULTING FROM MOVEMENT OF TRAINS

	Freight train miles	Killed	Injured
1903	526,000,000	9,605	48,361
1904	535,000,000 Inc.	9,801 Inc.	52,916 Inc.
1905	546,000,000 Inc.	9,433 Dec.	55,613 Inc.
1906	594,000,000 Inc.	10,367 Inc.	63,417 Inc.
1907	630,000,000 Inc.	11,474 Inc.	71,630 Inc.
1908	587,000,000 Dec.	9,851 Dec.	64,714 Dec.
1909	568,000,000 Dec.	8,470 Dec.	54,238 Dec.
*1910	635,000,000	....	....
1911	626,000,000 Inc.	9,957 Inc.	70,922 Inc.
1912	612,000,000 Dec.	10,185 Inc.	77,175 Inc.
1913	644,000,000 Inc.	10,550 Inc.	86,688 Inc.
1914	612,000,000 Dec.	9,893 Dec.	79,388 Dec.

*Complete accident statistics for 1910 are not available.

The table shows that in 1905 there was an increase in freight train mileage and a decrease in the total number of persons killed. Again in 1912 there was a decrease in freight train mileage and an increase in the total number killed and the total number injured. In every other instance during this period an increase in freight train mileage was accompanied by an increase in casualties and a decrease in freight train mileage was accompanied by a decrease in casualties.

The proposed legislation is not in the interest of safety. It would be impossible to suggest legislation which would have a more certain tendency to reduce safety. The bill ought to be entitled, "An act to increase the cost of rendering transportation service to the public and to add to the number of people killed and injured on railways."

THE DISTURBANCE OVER THE WESTERN ARBITRATION

THE board which arbitrated the demands of the engineers and firemen of the western railways has made its award, and the representatives of the engineers and firemen are vigorous in their denunciations of it. They criticize the attitude of Arbitrator Charles Nagel, and announce that they will seek a congressional investigation of the action of the Mediation and Conciliation Board in appointing him, and the part he took in the arbitration. They charge that his business and professional affiliations necessarily prejudiced him against the demands of the engineers and firemen, and that his attitude was hostile to them during the hearings.

In order that a fair and rational opinion may be formed regarding this case, its outcome and the complaints of the representatives of organized labor, it is necessary to review the case from the beginning. In October, 1913, the engineers and firemen presented to the railways requests for increases in wages and numerous changes in the rules controlling their conditions of service. The railways, in reply, gave notice of the termination of the existing contracts and made counter proposals. The employees responded by demanding still larger increases of wages and additional improvements in their conditions of service.

The Board of Mediation and Conciliation finally was asked to intervene. After it had made numerous futile proposals, it suggested to the employees that both the demands of the railways and the secondary and additional demands of the employees be dropped and that only the original demands of the employees be arbitrated. The employees having everything to gain and nothing to lose by this plan, accepted it. The railways, having everything to lose and nothing to gain by it, rejected it. The railways were thus put in the position of refusing to arbitrate, although they had first asked for arbitration. When a breach seemed inevitable, President Wilson appealed to the roads in the name of patriotism to accept this one-sided basis to save the country from a great railway strike when its prosperity was imperiled by the war in Europe. Thus put into a hole by the federal board of mediation and pushed still further into it by the President, the railways, practically under duress, agreed to a plan by which they had everything to lose and nothing to gain.

In accordance with the provisions of the Newlands Act the railways and the employees appointed two representatives each on the Board of Arbitration. These four could not agree on the two impartial arbitrators. Judge Peter C. Pritchard and Charles Nagel, formerly secretary of Commerce and Labor, were therefore appointed by the Board of Mediation. Between the time of their appointment and the beginning of the arbitration nine days elapsed. This was ample for both sides to investigate them. As both had national reputations, nothing could have been easier than to have learned all about their antecedents and affiliations. But no objection was made to either of them. The public hearings, the filing of briefs and the arguments took five months. During this time no objection was made to either of them. But after the arbitrators had been conferring some time, and the representatives of the employees knew what the award would be, they began to bombard President Wilson and the Board of Mediation and Conciliation with telegrams charging Mr. Nagel with unfitness because of his business connections, and demanding his removal.

The implication that the Board of Mediation and Conciliation appointed Mr. Nagel in a spirit of hostility to the engineers and firemen will not bear scrutiny in view of the board's previous action in putting the railways in a position where they were forced to accept a basis of arbitration entirely unfavorable to them. Furthermore, the action of the employees in postponing their complaints about Mr. Nagel until they knew what the award would be, convicts them of utterly unfair practice. If there was anything questionable in his affiliations the representatives of labor should have informed themselves about this and made their objections to him before the arbitration began. Messrs. Stone and Carter in a public statement assert, however, that they did not inform themselves on this subject. Why didn't they? Were they not being paid by the engineers and firemen to represent them in all matters bearing on the controversy? Mr. Nagel had been a member of the President's cabinet. He had been for years one of the most prominent men, politically, professionally and in business in St. Louis. Everybody in that city who reads the newspapers, and many persons throughout the country, know him by reputation. And yet Messrs. Stone and Carter say they knew nothing about him and never took the pains to inquire! Messrs. Stone and Carter think they have drawn an indictment of Mr. Nagel. What they have drawn is an indictment either of their own fairness, or of their competency to represent their brotherhoods in matters of importance.

Their avowed failure to inform themselves concerning the arbitrators was on a par with the way they conducted the entire case. They led their followers into making demands so unreasonable that no fair body could have granted any considerable part of them. Such a bad case needed skillful handling—a need accentuated by the fact that the railways had made very elaborate and thorough preparations for the presentation of their side. The representatives of the labor unions met the issue largely by the methods of the pettifogger, the muckraker and the barnstormer. They put into the records the most outrageous misquotations of statements which they attributed to railway officers and railway publications. They agreed at the start that the financial ability of any road to pay reasonable wages was not a factor in the case and then deluged the record with muckraking misrepresentations regarding the alleged financial mismanagement of western railways. It was the bad case of the employees

and the incompetent way it was presented, and not the attitude of the arbitrators, which caused their defeat. The purpose of the disturbance which Messrs. Stone and Carter are now kicking up seems to be to put on Mr. Nagel the odium of a result for which they themselves are responsible.

Since the representatives of the employees want a congressional investigation, the *Railway Age Gazette* hopes that the railways will join them in asking for it. But if there is to be one let us have it go into the entire history of this controversy. Let us also have it go into the entire labor situation on the railways of the United States and the methods which the government should adopt for dealing with them. That situation needs thorough ventilating. The procedure for mediation and arbitration provided by the Newlands Act is not adapted to permanently prevent strikes and lockouts or to get wages and conditions of work put on the right basis. The sooner all the pertinent facts regarding the labor situation on the railways of this country are presented to Congress and it takes action accordingly, the better it will be for the railways and their employees, and especially for the general public.

NEW BOOKS

Proceedings of the Master Tinners', Coppersmiths' & Pipefitters' Association. Compiled and published by W. E. Jones, secretary of the association, Chicago & North Western Railway, Chicago, Ill. 83 pages, 6 in. by 9 in. Bound in paper.

This book is the report of the second annual convention of the American Railroad Master Tinners', Coppersmiths' & Pipefitters' Association, and contains papers on Oxy-Acetylene Welding, Shop Efficiency, Alloys and Their Uses, Tin Roofing vs. Canvas Roofing, and Specialized Training.

The Mechanical World Pocket Diary and Year Book. 298 pages, net, 4 in. by 6 in. Bound in cloth. Published by Emmott & Company, Ltd., Manchester, England. Sold in the United States by The Norman Remington Company, 308 North Charles street, Baltimore, Md. Price 50 cents, postpaid.

This well known book contains a large amount of information covering a wide range of engineering subjects, all of which has been brought up to date in the new edition. Aside from the revision of material which the book formerly contained, a number of new sections have been added including some useful notes on gear cutting, a new section dealing with limit gages and another containing information relative to the strength of flat plates. A large number of tables are given, several of which are included for the first time this year, and many additional illustrations have been introduced. The present edition marks the twenty-eighth year of publication of the Pocket Diary and Year Book, and it has met with much favor because of its moderate price and the concise form in which the subject matter is arranged.

The Mechanical World Electrical Pocket Book. 224 pages, net, 4 in. by 6 in. Bound in cloth. Published by Emmott & Company, Ltd., Manchester, England. Sold in the United States by The Norman Remington Company, 308 North Charles street, Baltimore, Md. Price 50 cents, postpaid.

The electrical pocketbook is a companion volume of the well-known Mechanical World Pocket Diary and Year Book. The 1915 issue has been thoroughly revised and a number of new sections added. The section on electricity on shipboard has been rewritten and considerably extended, while additions have been made to the sections on electricity in coal mines, motor starters and others. A number of sections have been revised and condensed, and as it now stands this little volume contains a large amount of up-to-date information covering the whole range of electrical engineering which should be especially useful to those in charge of electrical plants and machinery. Aside from the engineering information the book contains a number of mathematical tables and also includes a conveniently arranged diary. It is well indexed and its convenient size and low price commends it to those who desire a ready source of general information on electrical subjects.

Letters to the Editor

THE TRAINMASTER AND THE ENGINE-HOUSE FOREMAN

Haileyville, Okla.

To the Editor of the Railway Age Gazette:

The discussions in the *Railway Age Gazette* on the relation between the trainmaster and the engine house foremen cover a broad field and are applicable to other departments as well. The friction alluded to is only the result of lack of harmony prevailing among the employees of the departments and of breadth of mind sufficient to appreciate the other man's duties and responsibilities.

The trainmaster and the chief despatcher are responsible for the movement of trains; the engine house foreman is responsible for the condition of the power to handle the trains. Without good power transportation suffers in the end. The engine house foreman is supposed to send the engines out in such shape that they will make successful trips to the end of the division; to enable him to do this he must have support from the operating department in various ways.

The transportation department should give to the engine house foreman a "sight" report at 7 a. m. and 7 p. m. showing what is moving toward him, together with the individual engine numbers, the names of the enginemen and firemen on the engines, whether they are handling full or light trains, and whether the engines in transit are experiencing any mechanical trouble; at the same time he should be given an approximate call for trains, barring accidents, of course, that will be required for the 12 hours ahead. With the above information at hand the foreman will be in a position to determine fairly well how soon and with what success he can turn the engines. This is not done in many cases, and on some roads not at all, and for that reason we cannot expect too much from the man in charge of the roundhouse or shop. When there is a demand for an engine at a particular hour and the engine house foreman is not ready for it the trouble begins. Then it is that the trainmaster or chief despatcher will in all probability criticize the foreman or will beg him to let the engine go and *we* will take the chances. If the chance is taken and a failure occurs, who gets the worst of it? No one but the transportation department as a train is out on the road with no engine and light mileage will of necessity have to be made to expedite the movement of this train, to say nothing of the delay to the freight; with all of this the engine house foreman will be severely criticized both by the superintendent and master mechanic.

There is no more reason why the transportation department should deal harshly with the mechanical department because an engine cannot be produced just at the time desired than there is for the mechanical department to criticize the transportation men because they do not hurry the power into the terminal. Each has its duties to perform and each should be the judge as to the better way to handle its own matters. I have seen cases where an engine pulled into a terminal and before it had time to reach the roundhouse the trainmaster or chief despatcher would telephone the engine house foreman and say, "Here is the 999, how soon can you get it ready? We want it for an extra east right away." They will keep this up until the patience of the man trying to turn the engine is exhausted. It may be that this engine does not reach the roundhouse promptly, possibly is blocked by a switch engine, or something else occurs which is likely to cause delay in a yard; then when the engine house foreman has put all his energy on the engine and reports it ready to the chief despatcher, a transportation problem, such as incoming trains bunching near the terminal, yardmaster being unable to get the train ready, or similar difficulty prohibits the engine being run at the time wanted. Again, it is customary

to avoid paying time-and-a-half to machinists, boiler makers and other mechanics for overtime; therefore it is necessary to close the work down possibly between 5 and 7 a. m. and 5 and 7 p. m.; if this custom prevails it is known to all that during these hours no work can be done on engines. Then why embarrass the engine house foreman by trying to work out the impossible?

In my experience of several years working with engine house foremen and handling heavy divisions, it has been my aim to work harmoniously with them, giving them all the assistance that I possibly could, and keeping them advised of the situation at all times. I have never found one yet that would not strain a point to help out and do it cheerfully. There is a way to secure the desired results and to maintain a friendly feeling at the same time.

J. L. COSS,
Despatcher, C. R. I. & P.

FACTOR OF ADHESION IN STEAM LOCOMOTIVES

ST. MARYS, Pa.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The article that appeared in your issue of April 9, 1915, page 778, under the title "Why Use a High Factor of Adhesion in Steam Locomotives," is one that has deserved more consideration from motive power men than it has received, and there is no doubt in the mind of the writer as to the correctness of the stand that the author has taken.

For some years past the reduction of the cost of transportation seems to have been a matter of the greatest consequence. The superheater, mechanical stoker and other appliances are really responsible for the great economic claims made for the Pacific and Mikado types, rather than the locomotives themselves. Consolidation and Mikado type locomotives of the following dimensions been working on the same road on heavy grades with curves as sharp as 12½ deg. for three or four years, and there appears to be very little difference in their performance. While no conclusive records have been kept the coal consumption of the Mikados does not indicate any saving over the Consolidations:

	Consolidation	Mikado
Diameter of boiler	79 in.	79 in.
Grate area	57 sq. ft.	57 sq. ft.
Total heating surface	3,143 sq. ft.	3,682 sq. ft.
Total weight of locomotive	199,850 lb.	226,300 lb.
Weight on drivers	178,950 lb.	179,950 lb.
Cylinders	22 in. by 28 in.	22 in. by 28 in.
Diameter of drivers	51 in.	51 in.
Total weight of locomotive and tender	339,100 lb.	368,600 lb.
Steam pressure	200 lb.	200 lb.
Tractive effort	45,169 lb.	45,169 lb.
Superheater and mechanical stoker	None	None

The writer has been opposed to the building of 4-4-2, 4-6-2 or 2-8-2 types of locomotives for a road on which the conditions would permit the use of the 2-6-0, 2-8-0 or 2-10-0 types, for the reason that considerably more unproductive weight is necessary in an engine having a four-wheel engine truck than in one with a two-wheel truck. The trailer truck is only a source of expense, and the weight resting on it could be put to much better service. Of course, on roads where the curvature is very sharp it may be necessary to use a trailer truck, but where such conditions do not exist the writer can see no good reason why the natural development of the Mogul and Consolidation types should not be utilized. There are Moguls hauling passenger trains and giving excellent service, demonstrating that it is not necessary to use a four wheel engine truck in passenger service.

The primary arguments in favor of the Mikado, are the greater tonnage that it will haul, and a saving in fuel and water. Of course the Mikado shows up better in the various tests and comparisons made, but most of these are anything but fair to the Consolidation, for the reason that the Mikado has invariably been a heavier engine, usually equipped with a superheater, and sometimes with a mechanical stoker or other appliances that the Consolidation did not have. Had the Consolidation and the Mikado been of the same total weight, exclusive of the tender, with the trailer truck weight of the Mikado put on the drivers of the Consolidation, and had the same ratio of adhesive weight to tractive effort used in the Mikado been given to the Consolidation, with the same superheater, mechanical stoker, etc., the results would have been as much in favor of the Consolidation as they now stand against it.

Another argument in favor of the Mikado is that we cannot get sufficient firebox and boiler capacity in the Consolidation type. Let us look into the necessity for the deep firebox first. The Erie Triplex locomotive has not an exceedingly deep firebox; this allows the placing of a 63 in. driving wheel under the firebox, and yet the boiler generates sufficient steam for three sets of large cylinders. It is doubtful if there has been a Mikado built with driving wheels larger than 63 in. In this connection the writer has not thought it impossible, assisted by a mechanical stoker and superheater, to develop a long narrow firebox that would meet the conditions more successfully than the present wide firebox fired by hand. A great many boiler troubles arise from the fireman's being unable to utilize the entire grate area of a firebox containing only 57 sq. ft. on long, hard runs. This is especially true in the summer, when he frequently fires with a bank at the back end to protect himself from the intense heat. Moreover, firemen often become almost exhausted by the time they have completed two-thirds or three-quarters of the trip and allow the fire to become dirty or die next to the tube sheet, leaving the locomotive burn what coal it will to obtain enough steam to get to the terminal. The use of such a long firebox would permit of larger diameter drivers being placed beneath it.

The length of rigid wheel base seems to have been an objection offered for not developing the Consolidation type, but this is no argument when we consider some of the advertising matter that has been put before the public. For example, I quote from two advertisements in the *Railway Age Gazette:* "The Erie locomotive, although it has a rigid wheel base of 22 ft. can traverse curves of 16 deg"; and "the locomotives illustrated are operating on grades of 4 per cent and curves of 16 deg."

Where a road has curves no sharper than 10 deg. in its main line, it is questionable if a 2-8-2 or a 2-10-2 are the proper types of locomotives to build when considered from the point of mechanical efficiency. Let us see if we cannot obtain a rigid wheel base for the 2-8-0 and 2-10-0 types sufficient to provide boiler capacity that will take care of the natural development of these classes for roads not having sharper curves than 10 deg.

To find the middle ordinate for the rigid wheel base of a Mikado, the rigid wheel base of which cannot be far from 17 ft. 6 in., on a 16 deg. curve, using the formulas

$$M = \frac{C^2}{8R} \text{ and } C = \sqrt{M\,8\,R}$$

In which M = the middle ordinate,
C = the rigid wheel base of the locomotive,
R = the radius of the curve;

we have

$$M = \frac{17.5 \times 17.5}{8 \times 359.26} = .10655 \text{ ft. or } 1.2786 \text{ in.}$$

therefore using .10655 ft. for the middle ordinate of a 10 deg. curve we have,

$$C = \sqrt{.10655 \times 8 \times 573.69} = 22 \text{ ft. } 1\ 3/16 \text{ in.}$$

The 2-10-2, by the same method, would have a rigid wheel base of 28 ft. 1 3/16 in. It will therefore be seen that another pair of driving wheels could be used if the firebox were constructed like that of the Erie Triplex. Taking the dimensions of the Mikado in question, the natural development of this locomotive would have been a 2-10-0, with proportion something like the following:

Total weight of locomotive, exclusive of tender	276,600 lb.
Weight on front engine truck, approximately	26,000 lb.
Weight on driving wheels	250,000 lb.
Cylinders	28 in. by 32 in.
Steam pressure	180 lb.
Tractive effort, approximately	61,000 lb.
Factor of adhesion	4.09

Equipped with superheater and mechanical stoker.

E. F. GIVEN.

Arbitration Award In Enginemen's Wage Controversy

Engineers and Firemen on Western Roads Given Only Slight Increase in Pay and Changes in Working Rules

The board of arbitration appointed under the Newlands law last year to settle the controversy between the western railroads and the engineers' and firemen's brotherhoods on the demands of the enginemen for increases in wages and changes in the rules controlling conditions of service, filed its award in the United States district court at Chicago on April 30. The award grants some comparatively slight increases in pay and a number of rules making changes in working conditions and in the basis for computing compensation, although with many important modifications in the form of the demands as submitted by the men, while some of the rules asked for were denied entirely.

The board of arbitration consisted of J. C. Pritchard, of Asheville, N. C., former judge of the United States circuit court, chairman; Charles Nagel, of St. Louis, former secretary of commerce and labor; H. E. Byram, vice-president of the Chicago, Burlington & Quincy; W. L. Park, vice-president of the Illinois Central; F. A. Burgess, assistant grand chief of the Brotherhood of Locomotive Engineers, and Timothy Shea, assistant president of the Brotherhood of Locomotive Firemen and Enginemen.

The award was signed only by the first four of the arbitrators named. Mr. Burgess and Mr. Shea presented a minority report, protesting against the award as unfair and unsatisfactory. Chairman Pritchard also filed a memorandum saying that in his opinion some of the rates agreed upon are not as high as they should be, but that he had joined with other members of the board in making the award because some of the rules agreed upon accord to the men substantial benefits which should not be denied them. Mr. Park and Mr. Byram also filed a statement that their signatures to the award do not imply approval of it in principle or in detail, saying that the agreement under which the arbitration was held gave no latitude to the board to adjust or reconcile unequal conditions.

The various developments in the controversy and the hearings before the board have been fully reported in previous issues of the *Railway Age Gazette*. The demands of the enginemen were comprised in 16 articles which were submitted to the board. It was estimated by the railroads that if the demands were granted in the form submitted the increase in their payrolls would amount to $41,000,000 a year, or about 51 per cent. The award of the board with a comparison of the demands made by the men on each article, is as follows:

ARTICLE I.—BASIS OF DAY'S WORK AND OVERTIME.

Passenger Service.—The minimum passenger rate for engineers shall be $4.30, and for firemen $2.50; 100 miles, or less, 6 hours and 40 minutes, or less, shall constitute a minimum day's work in all classes of passenger service except as otherwise specified herein; miles made in excess of 100 pro rata.

On short turn-around runs, no single trip of which exceeds 80 miles, including suburban service, overtime shall be paid for all time actually on duty or held for duty in excess of 8 hours (computed on each run from the time required to report for duty to end of that run) within 12 consecutive hours; and also for all time in excess of 12 consecutive hours computed continuously from the time first required to report to final release at end of last run. Time shall be counted as continuous service in all cases where the interval of release from duty at any point does not exceed one hour.

All other passenger overtime shall be computed on the basis of 15 miles per hour from the time required to report for duty until released, and separately for each part of a round trip run. All passenger overtime will be paid for at the rate of 75 cents per hour for engineers and 45 cents for firemen, and will be computed on the minute basis. When employees of any road elect to retain their present overtime basis, no part of this article is to be used in computing or paying passenger overtime.

Freight Service.—The minimum freight rate for engineers and firemen shall be according to class of locomotive, as provided in Article II, for 10 hours, or less, or 100 miles, or less; miles made in excess of 100 pro rata. Overtime in freight service is to be computed on the basis of 10 miles per hour, and paid pro rata on the minute basis.

General.—Road engineers and firemen required to perform a combination of more than one class of road service during the same trip will be paid at the rate and according to the rules governing each class of service for the time or miles engaged in each, but will be paid for the entire trip not less than a minimum day at the highest rate applying for any class of service performed during such trip. Where two or more engines of different weights on drivers are used during a trip or day's work, the highest rate applicable to any engine used should be paid for the entire day or trip.

In the article proposed by the employees it was provided that in passenger service five hours or less should constitute a day's work, and that overtime should be paid for on a basis of 20 miles per hour. In all other service except passenger and switching service, it was provided that overtime should be computed on a basis of 10 miles per hour and paid for at the rate of 15 miles per hour.

ARTICLE II.—RATES OF PAY.

Passenger Service.—The minimum rates of wages per day shall be:

	Engineers	Firemen Coal	Firemen Oil
Engines less than 80,000 lb. on drivers	$4.30	$2.50	$2.50
Engines 80,000 lb. and less than 100,000 lb. on drivers	4.30	2.55	2.50
Engines 100,000 lb. and less than 140,000 lb. on drivers	4.40	2.60	2.50
Engines 140,000 lb. and less than 170,000 lb. on drivers	4.40	2.70	2.55
Engines 170,000 lb. and less than 200,000 lb. on drivers	4.45	2.85	2.70
Engines 200,000 lb. and less than 250,000 lb. on drivers	4.45	3.00	2.85
Engines 250,000 lb. and less than 300,000 lb. on drivers	4.65	3.20	3.05
Engines 300,000 lb. and less than 350,000 lb. on drivers	4.80	3.40	3.25
Engines 350,000 lb. and over on drivers	4.80	3.60	3.45
Mallet engines regardless of weights on drivers	5.00	4.00	3.85

Freight Service.—The minimum rates of wages per day shall be:

	Engineers	Firemen Coal	Firemen Oil
Engines less than 80,000 lb. on drivers	$4.75	$2.75	$2.75
Engines 80,000 lb. and less than 100,000 lb. on drivers	4.80	2.85	2.75
Engines 100,000 lb. and less than 140,000 lb. on drivers	4.85	3.00	2.85
Engines 140,000 lb. and less than 170,000 lb. on drivers	5.10	3.20	3.05
Engines 170,000 lb. and less than 200,000 lb. on drivers	5.30	3.45	3.30
Engines 200,000 lb. and less than 250,000 lb. on drivers	5.45	3.70	*3.55
Engines 250,000 lb. and less than 300,000 lb. on drivers	5.60	3.80	3.80
Engines 300,000 lb. and over on drivers	5.75	4.00	4.00
Mallet engines less than 275,000 lb. on drivers	6.00	4.00	4.00
Mallet engines 275,000 lb. and over on drivers	6.50	4.25	4.25

*Oil differential not to apply on engines weighing over 215,000 lb. on drivers.

Existing rates of pay per day that are higher than the above minima are hereby awarded.

Work, Wreck, Pusher or Helper, Mine Runs, Circus Trains, and Trains Established for the Exclusive Purpose of Handling Milk.—Through freight rates will apply on all work, wreck, pusher or helper, mine runs, circus trains, and to trains established for the exclusive purpose of handling milk; all according to class of engines; overtime to be computed on minute basis. Through freight rules in this award as to mileage and overtime to apply.

Belt Line or Transfer Service.—The board recognized that in belt line or transfer service the grade of work is clearly different from ordinary switching service, and may, therefore, properly be entitled to higher rate of pay; but the information before the board shows that conditions over the Western territory vary so widely in this service that they are unable to reach an agreement regarding a fair rate for such service. The board, therefore, refers the question of belt line or transfer service back to the engineers and firemen and the managements of the different roads for local settlements, which shall take into consideration the difference between belt line or transfer service and switching service, in fixing the rates of pay.

Grades of 1.8 Per Cent and Over.—The territory in which there exists a differential in rates of pay by reason of gradients has been long established, and we make no change in respect thereto. On railroads where a differential in the rates of pay for engineers and firemen is allowed under schedules in effect October 10, 1913, on account of grades or mountain service, either by excess rates or constructive mileage, such differential shall be maintained in addition to the rates granted by this award.

Narrow-Gage Locomotives.—This request is declined.

Electric Locomotives, Electric Either Multiple Unit or Single. Gasoline or Other Service.—Wherever electric service is installed as a substitute for steam, or is now in operation on any of the railroads parties to this arbitration, or on any of the tracks operated or controlled by any of them as part of their system, the locomotive engineers and firemen shall have the preference for the positions of engineers, or motormen, or helpers on electric locomotives or multiple-unit trains; but this right of the engineers and firemen shall not operate to displace any man operating electric power on any of the railroads parties to this arbitration, on May 1, 1915.

Since the use of electric locomotives or multiple-unit trains upon steam

railways is in so early a stage of development, and there is as yet no approximation to stable conditions, but a wide variation in existing practices, the board find themselves unable, from the evidence before them, to make any uniform rules regulating rates of pay and conditions of service for engineers, or motormen, or helpers employed on such trains. The minimum day's wage of $4.30 for engineers or motormen, and $2.50 for helpers in passenger service, and $4.75 for engineers or motormen, and $2.75 for helpers in freight service is, however, awarded; but the day's work covered by the same, both as regards hours of service and mileage covered, is that which now exists in electric service on the various roads, not that covered under the preceding headings pertaining to "freight and passenger service." This award is without prejudice to existing contracts for such service.

Additional Pay.—Through or irregular freight trains doing work such as loading or unloading freight, stock or company material, switching at stations, spurs, mines, mills, or required to pick up or set out cars, unless cars to be picked up are first out, or cars to be set out are switched together at terminals, or doing any other similar work, shall be paid for same at overtime rates in addition to time or mileage made on the trip.

In the article submitted by the employees the scale for passenger service ranged from $4.50 to $5.60 for engineers and from $2.90 to $3.75 for firemen. In all other classes of service, except passenger and switching service, and Mallet locomotives, the scale ranged from $5 to $6.70 for engineers and $3.25 to $4.50 for firemen. For Mallet type engines they asked rates ranging from $7.50 to $8.25 for engineers and $4.90 to $5.50 for firemen. A separate classification was made for locomotives weighing between 200,000 and 225,000 lb., and between 225,000 and 250,000 lb., while all engines weighing over 250,000 lb., except Mallets, were to be paid the highest rates asked. For divisions where the grade is 1.8 per cent or over, an increase of 10 per cent over valley rates was asked, and for narrow gage locomotives a 5 per cent increase over present rates was asked. For service on electric locomotives the article submitted provided a scale ranging from $4.50 to $5.60 for motormen in passenger service, and of $3.35 for helpers. In other service except passenger and switching the scale provided for rates ranging from $5 to $7 for motormen and $3.75 for helpers. For switching service the article proposed rates ranging from $4.75 to $6 for motormen and $3.10 for helpers.

ARTICLE III.—LOCAL OR WAY FREIGHT.

A minimum of 30 cents per 100 miles, or less, is to be added for local freight service to through freight rates for engineers and firemen, according to class of engine. Miles over 100 to be paid for pro rata.

The employees had asked for an increase of 10 per cent over through freight rates for local or way-freight service, and also for overtime rates in addition to time or mileage made on the trip for through or irregular freight trains doing such work as loading or unloading freight or picking up or setting out cars.

ARTICLE IV.—SWITCHING SERVICE.

Rates of Pay.—The minimum rate of wages per day of 10 hours or less; overtime pro rata on minute basis, shall be:

	Engineers	Firemen
Engines less than 140,000 lb. on drivers	$4.25	$2.70
Engines 140,000 lb. and over on drivers	4.40	2.75
MALLET ENGINES		
Engines 275,000 lb. or less on drivers	5.15	4.00
Engines over 275,000 lb. on drivers	5.40	4.00

Beginning and Ending of Day.—Time to begin when required to report for duty and to end at time engine is placed on designated track or engineer or fireman is released, exclusive of time off for meals.

Meals.—Engineers and firemen in switching service shall be allowed one hour for meals between the hours of 11:30 a. m. and 1:00 p. m., and between the hours of 11:30 p. m. and 1:00 a. m., but if required to work the meal hour or any part thereof, they will be paid for the hour in addition to the minimum day, and be allowed 30 minutes under pay for meals. The time for meals will commence at the time engineer and firemen are released from care of engine. Engineers and firemen will not be required to work longer than 6 hours without being allowed 30 minutes for meals.

Existing rates of pay per day that are higher than the above minima are hereby awarded

The employees had asked for rates ranging from $4.75 to $6 for engineers and $3.10 to $4 for firemen. They also asked that engineers and firemen required to begin service other than between the hours of 6 a. m. and 8 a. m., should be paid two cents an hour in addition. They also asked for overtime at the rate of time and one-half after 10 hours.

ARTICLE V.—BEGINNING AND ENDING OF A DAY.

In all classes of road service, an engineer's or fireman's time will commence at the time he is required to report for duty, and will conclude at the time the engine is placed on the designated track or relieved by hostler at terminal.

The article proposed asked for the payment of 30 minutes as preparatory time in addition to all other time or mileage made on the trip or day, and payment for one hour where rules or schedules require the men to be on duty more than 30 minutes before the time ordered to leave, and when required to be on duty more than one hour, payment for actual time.

ARTICLE VI.—TERMINAL DELAY.

Initial Terminal Delay.—Compensation for initial terminal delay is not allowed beyond that involved in the rule, that pay shall begin in all cases at the time an engineer or fireman is required to report for duty.

Final Terminal Delay.—For freight service final terminal delay shall be computed from the time the engine reaches designated main track switch connection with the yard track.

For passenger service, final terminal delay shall be computed from time train reaches terminal station.

Final terminal delay, after the lapse of 30 minutes, will be paid for the full delay at the end of the trip, at the overtime rate, according to class of engine, on the minute basis. If road overtime has commenced, terminal overtime shall not apply, and road overtime will be paid to point of final relief.

The employees asked payment for initial terminal delay from the time they are called to leave the roundhouse or other point until the departure of trains, and for final terminal delay from the time they arrived at passenger depot or switch leading from main line into yard, until relieved from duty, on the minute basis in addition to time or mileage made on trip.

ARTICLE VII.—AUTOMATIC RELEASE AND TIE-UP.

The request contained in the first paragraph of this article is denied.

Continuous Time.—Engineers and firemen in train service tied up under the law will be paid continuous time from initial point to tie-up point. When they resume duty on continuous trip, they will be paid from tie-up point to terminal on the following basis: For 50 miles or less, or 5 hours or less, 50 miles pay; for more than 50 miles and up to 100 miles or over 5 hours and up to 10 hours, 100 miles pay; over 100 miles or over 10 hours, at schedule rates. It is understood that this does not permit running engines through terminals or around other crews at terminals unless such practice is permitted under the pay schedule.

The rule submitted by the employees provided that engineers and firemen arriving at terminal or end of run are automatically released, and when used again may begin a new day. This paragraph was denied. The continuous time rule provided that engineers and firemen tied up between their terminals will be paid continuous time, no deductions to be made for time tied up.

ARTICLE VIII.—HELD AWAY FROM HOME TERMINALS.

Engineers or firemen in pool freight and in unassigned service held at other than home terminal, will be paid continuous time for all time so held after the expiration of 22 hours from time relieved from previous duty, at the rate per hour paid for the last service performed. If held 14 hours after the expiration of the first 32-hour period, he will be paid continuous time for the next succeeding 10 hours, or until the end of the 24-hour period, and similarly for each 24-hour period thereafter. Should an engineer or fireman be called for duty after pay begins, his time will be computed continuously.

The rule proposed by the employees provided for the payment of continuous time for time held at other than home terminals, including rest period, after the expiration of 15 hours from the time relieved from previous duty, at the rate per hour paid for the last service performed.

ARTICLE IX.—DEADHEADING.

Deadheading on company's business on passenger trains will be paid for the actual mileage at 4.3 cents per mile for engineers, and 2.5 cents per mile for firemen, and for deadheading on other trains at 4.75 cents per mile for engineers and 2.75 cents per mile for firemen; provided, that a minimum day at the above rates will be paid for the deadhead trip if no other service is performed within 24 hours from time called to deadhead. Deadheading resulting from the exercise of seniority rights will not be paid for.

The rule proposed by the employees provided that deadheading on company business should be paid for at the same rate and on the basis as the engineer and fireman on the train.

ARTICLE X.—HOSTLERS.

The minimum pay for hostlers will be $4.20 per day of 12 hours, or less, overtime pro rata. Only roundhouse employees who, in handling engines,

are required to have a knowledge of main line train movements will come under this designation. Engineers and firemen will have preference for positions as hostlers. This will not operate to disqualify those who now hold such positions, nor to prevent same being filled from other classes of employees who may be eligible thereto, who can qualify. All other roundhouse employees handling engines during 25 per cent, or more, of their daily assignment will receive $3 for 12 hours, or less, overtime pro rata. On roads where the right to legislate for hostlers has been conceded by the company to the engineers or firemen, such right as specified in individual schedules shall not be affected by the adoption of this article.

The article submitted by the employees provided that at points where an average of 6 or more locomotives are handled within 12 hours, hostlers shall be maintained; that hostling positions shall be filled from the ranks of the firemen and paid $3.35 per day, and $4.75 per day when required to make main line movements. It was also provided that when main line or road hostlers are paid the same rate as engineers in switching service, such positions shall be filled from the ranks of the engineers.

ARTICLE XI.—EFFICIENCY TESTS.

We recognize the necessity of making efficiency tests, but when such tests are made they should not be conducted under conditions that are hazardous to the employees.

The article submitted provided that the practice of conducting surprise tests by turning switch lights and placing red lights or flags, unaccompanied by torpedoes, beside the tracks, or wiring down automatic signals to proceed position be eliminated.

ARTICLE XII.—ASSISTANCE FOR FIREMEN.

On coal-burning locomotives, either passenger or freight, coal will be shoveled forward at specified points, whenever necessary, or by men riding on locomotives for that purpose, so that it can be reached by firemen from deck of the locomotive. Coal of proper size for firing purposes will be placed on all tenders. It is understood that the committees on individual roads will take up with their respective officers the question of shoveling coal forward on tenders and determine the points where men shall be located to do this work.

The rule is substantially that asked by the employees.

ARTICLE XIII.—TWO FIREMEN.

When a second fireman is deemed necessary on coal-burning locomotives in freight service weighing more than 200,000 lb. on drivers, the matter will be taken up with proper officials of individual railroads by the committee. Failing to reach a settlement, the matter shall be referred to an adjustment commission to be composed of five persons, two of whom are to be chosen by the railroad company, two by the committee, and one to be selected by the four thus chosen who shall be the chairman of the commission. Should the four men fail to agree on the fifth, then three days after the last of the four have been selected, the fifth man shall be named by the United States Board of Mediation and Conciliation. If, for any reason, the selection of the fifth man cannot be made by the United States Board of Mediation and Conciliation, he shall be named by the United States district judge of the district in which the controversy may have arisen. All expenses incurred in connection with the settlement of such matters shall be borne equally by the two parties to the controversy.

When two firemen are employed on a locomotive as a result of the application of the preceding paragraph, they shall each be paid the rate for the class of engine next below, per Article II of this award.

The employees' rule provided that on coal burning locomotives weighing 185,000 lb. or more, when used in freight service two firemen should be employed.

ARTICLE XIV.—MISCELLANEOUS.

Cleaning of Locomotives.—On railroads where firemen are required to clean locomotives, they shall be relieved of such cleaning.

Setting Up Wedges, Filling Grease Cups, Cleaning Headlights, also Placing Supplies on Locomotives.—Where engineers and firemen are required to set up wedges, fill grease cups, or clean headlights, they shall be relieved of such service at all points where competent roundhouse force is employed. Neither will they be required to place on, or remove tools or supplies from locomotives, fill lubricators, flange oilers, headlights, markers or other lamps at points where roundhouse force or an engine watchman, is employed.

These rules are substantially as requested by the employees.

ARTICLE XV.—OFFICIAL RECORD OF WEIGHTS ON DRIVERS.

For the purpose of officially classifying locomotives, each railroad, party to this arbitration, will keep bulletins at all terminals showing actual weight on drivers of all engines in its service.

This rule is substantially that requested.

ARTICLE XVI.—THROWING SWITCHES AND FLAGGING.

The complexity of the service and the variety of the rules are such that this board does not deem it wise to undertake to formulate a general rule upon this subject at this time.

The rule proposed by the employees provided that engineers and firemen would not be required to throw switches, flag through blocks, or fill water cars.

GENERAL REGULATIONS

In awarding the above rates, rules and conditions it is understood that the engineers or firemen on any railroad may elect to take any daily rate, rule, or condition as herein awarded, but the board denies right of the men to take a part or whole of any rule herein awarded and couple it with a part or whole of any rule in the present schedule and thereby create a new condition not contemplated by the award.

Nothing herein is to be construed to deprive the engineers or firemen on any railroad from retaining their present rules and accepting any daily rate that may be awarded, or retain their present daily rate, and accept any awarded rule. It is further understood that the foregoing does not in any manner conflict with or nullify any part of Article 12 of the arbitration agreement, which reads as follows:

"That any rates of pay, including excess mileage or arbitrary differentials, that are higher, or any rules or conditions of employment contained in individual schedules in effect October 10, 1913, that are more favorable to the employees than the award of said board, shall not be modified or affected by said award."

STATEMENT BY CHAIRMAN

The memorandum filed by Chairman Pritchard is as follows:

"I deem it proper to say that in my opinion the freight rates, as well as the yard rates for firemen and engineers, agreed upon by the board, are not as high as they should be. Nevertheless, the rules as respects weight on drivers, time constituting a day's work, initial and terminal delay and overtime, passenger rates and rules, and other rules, accord to the men substantial benefits which should not be denied them. Therefore, in order that the provisions of the award may be put into effect and the men permitted to enjoy the benefit accruing therefrom, I conceive it to be my duty to join other members of the board in making this award.

"I am satisfied that as respects many of the propositions submitted to us we have approached as near as may be at this time a standardization of many important rules and rates which will, in the future tend to remove many things that have been the cause of innumerable controversies between the railroads and their employees."

STATEMENT OF RAILROAD ARBITRATORS

The statement filed by Arbitrators Park and Byram is as follows:

"That our signatures to the award may not imply approval of it, in principle or in detail, a brief word of explanation seems necessary.

"Any scheme of standardization or approach to it which does not permit of equalization of dissimilar rates and rules, in our opinion, is unsound. The agreement under which the arbitration was held gave no latitude to the board to adjust or reconcile unequal conditions. It was one-sided. It permitted standardization only if upward.

"To such provisions of the award as confer benefits upon men whose present rates and conditions merit adjustment we are in hearty accord; to those who, in our judgment, the testimony showed to have been liberally paid and properly treated, we feel that nothing additional is due, and, in agreeing to changes in their rates and rules and to other conditions of the award, it was only because it was made apparent that these changes were necessary if we were to have an award at all. It appeared to us that for the maintenance of the principle of arbitration for the adjustment of labor disputes, which is the public interest, our duty lay in this direction, even though additional burdens of expense and regulation follow."

MINORITY REPORT OF BROTHERHOOD REPRESENTATIVE

The minority report filed by Messrs. Burgess and Shea, the brotherhood representatives on the board, declared that the decision has not in any manner settled the questions submitted for arbitration and simply postpones any further action on the questions involved for a period of 12 months. It is declared that the board "has substantially disregarded testimony of witnesses for employees relative to the long hours and heavy tonnage trains, and, in fact, all the prevailing conditions in the western country, giving little or no consideration to the exhibits, which in a graphic way clearly set forth the increased productive ef-

ficiency of engineers and firemen, disregarding the evidence contained in numerous reports by railway officials as to the work of firemen on large engines having almost reached the limit of human endurance." It is also asserted that "a great opportunity to bring about industrial peace and the hearty co-operation of the employers and the employees has been lost by the failure of the board to equitably and justly settle the questions involved." The information shown by some of the railroads' exhibits, they say, is calculated to mislead and inaccurately represent the actual facts, for while the wages "in some instances might appear liberal when the aggregate amounts only are considered, close investigation in every case revealed the fact that the engineers and firemen had either run a great number of miles or worked from 13 to 20 hours a day during the month. An attempt to pursue such a method would compel the toiler to work more hours instead of raising the rate per hour."

"The whole theory is so repugnant to us," they say in conclusion, "that we feel it our duty to advise not only all railroad employees, but every organization of labor to seek by every influence to secure the revocation of a law that has the smallest tincture of that principle embodied therein. The unfairness of the award as handed down by a majority of this board compels us to file a dissenting opinion. To do otherwise would tacitly give assent to an award that does not permanently settle any of the questions involved and one that unquestionably will create chaos and ill feeling among all classes of train service employees and particularly engineers and firemen."

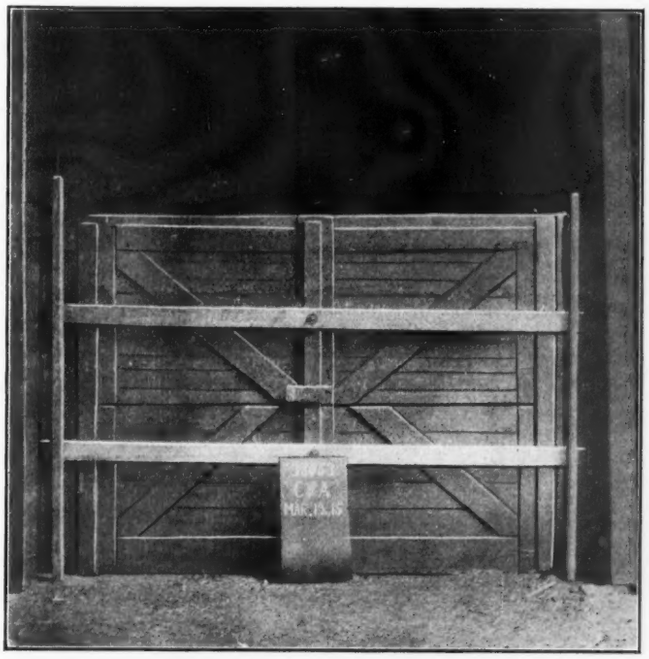
Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers, and W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen, in a statement given to the newspapers said that they had been "grossly deceived in being compelled to submit the case to a jury on which sat not only two railroad officials, but also one alleged neutral arbitrator who has shown by his conduct and demeanor throughout the whole hearing that he was the violent partisan of the railroads." Even before the award was filed they attempted to cast discredit upon it by sending protests to President Wilson and the members of the United States Board of Mediation and Conciliation at Washington, demanding the removal of Mr. Nagel as an arbitrator, on the ground that they had just discovered that he was a trustee of the Adolphus Busch estate of St. Louis, and a director of the Union Trust Company of St. Louis, and of the Northwestern Mutual Life Insurance Company of Milwaukee, all large holders of railroad securities. Messrs. Chambers and Knapp of the Board of Mediation and Conciliation, and later President Wilson, replied asking that the protest be withheld, but it had already been filed with the board of arbitration. After an exchange of telegrams and a conference with the President the Board of Mediation and Conciliation declined to act on the protest, saying that Mr. Nagel's connection with the Busch estate was known to the board before his appointment. It was not recalled that any of the board knew he was a director of the companies named, but a knowledge of that fact would have been favorable rather than otherwise to his appointment. The telegram continued:

> You doubtless had as much information regarding Mr. Nagel's business connections as any member or officer of this board prior to his appointment, and you had ample time to make further inquiries before the organization of the arbitration board and the acceptance of his services, and certainly before the extension of the life of that board, which was the act of yourselves by agreement with the railroad representatives independently of the board of mediation and conciliation.
>
> The foregoing statement is not made for the purpose of escaping any responsibility on the part of any member or officer of this board for Mr. Nagel's appointment, for nothing was known before his appointment nor has been brought to our knowledge since his appointment which in our opinion disqualifies him as an arbitrator, and our confidence in his ability and integrity remains unchanged.

Messrs. Carter and Stone announced that they would not attempt to appeal from the award to the courts, but that they would abide by it for a year. At a meeting in Chicago on Sunday and Monday of the general chairmen of the two organizations to consider the award, resolutions were adopted recommending that the executive officers of the brotherhood endeavor to obtain a congressional investigation of the award and of the appointment of Mr. Nagel.

CAREFUL LOADING OF PACKAGE FREIGHT

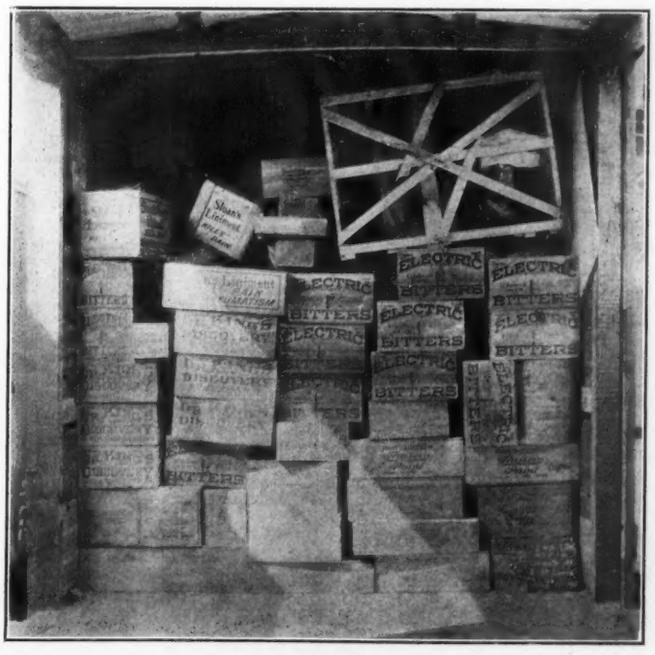
The Chicago & Alton, at its freight houses in Chicago and St. Louis, has been making some interesting experiments in the loading of package freight with a view to economizing space (and therefore saving cars), and also looking to the reduction of



Bulkhead Used in Chicago & Alton Freight Cars

breakages and a consequent diminution of claims for loss and damage.

O. Ashworth, freight claims inspector, as a result of his study of a large number of damage claims, concluded that better



Twenty-five Ton Load After a Journey of 284 Miles; Bulkhead Removed

stowing in the cars would prevent a good deal of damage, and he suggested the use of bulkheads in the cars to hold packages in place. In the past, merchandise cars have been loaded with only about 12,000 lb. to 20,000 lb., with a view to keeping at the minimum the damage from shifting. In commencing the experiments with bulkheads, it was found that to secure the best results, packages should be loaded to the roof. With each of the two ends—two half cars—nearly filled, loading was stopped and the bulkheads were put up. For these old doors of worn-out box cars were utilized. These were braced with scantlings 2 in. x 4 in., the pieces being attached to the center of the old door by a pivot, and the ends held in place by cleats at the sides of the car. The cost of nails, lumber and labor in applying the bulkheads was trivial, and the same material is used over and over again.

It developed that usually cars could be loaded with 40,000 lb. of freight, while in one instance, a car was loaded with 49,500 lb.

Of 31 cars which were loaded for test purposes, and which contained 12,440 packages, only one turned out other than perfect. In this car one package was found damaged to a trifling amount. Under former methods of loading, and without the protection of bulkheads, damage claims are reported to have averaged three per car, amounting perhaps to $10 a car. Thus in carrying six or seven hundred tons of freight there was an estimated saving of perhaps $700 to $1,000 in the prevention of claims and the saving of the time of 60 cars; or, if there is a surplus of cars, still there is the saving of the unnecessary haulage of 60 cars, and saving of track room at freight houses, etc.

The prevention of damages in transit is, of course, a constant element in the successful carrying on of the freight business in a way to satisfy shippers and consignees.

WHERE THE DELIVERING AGENT FALLS DOWN

By D. C. Davis

Shippers of less than carload freight, of uniform kind or in uniform containers, frequently *mark* one or more packages too many for one consignee and destination and one or more too few packages for another consignee and destination.

These shipments may be sent in ferry cars to a transfer and the receiving clerk may never see them; or they may be loaded into the car by the shipper's drayman at a station and the receiving clerk may never have an opportunity to check the markings with the shipping order; or the receiving clerk may have an opportunity to check the shipment and not notice the errors in marking, being satisfied as long as he counts up the number of packages and finds it corresponds with the number called for on the shipping order. In either case the shipper is furnished with a bill of lading and the railroad's responsibility begins.

The result of such an error would then be something like this: The agent at, say, San Francisco receives six boxes of soap for John Jones, while he holds billing for five boxes only (one over). The agent at Boston receives four boxes of soap for William Smith, while he holds billing for five boxes (one short).

The agent at San Francisco, knowing Jones to be a reliable man, and on the accommodation list, credit good, turns over all the boxes to Jones and puts out a request for correction of billing, which may or may not come along in six months or a year. Anyhow, it is all forgotten and Jones is in a box of soap, innocently or otherwise.

Right here is where the delivering agent falls down. He should never have delivered this package to Jones without presentation of bill of lading, or other proof of ownership.

In the meantime let us look into the Boston situation. William Smith has been billed for five boxes of soap and has only received four boxes. He waits a while and then puts in a claim for the other box. Investigation is made, the goods are found to have been received and checked O. K. at originating point; short at destination, one box; somewhere in between shipping point and destination a box has gone astray or has been stolen. Good checking through transfer stamps may enable the investigator to finally locate where the over package went to. The difficulties of this, however, increase with the distance the two destinations are apart.

Then come up questions of duplicated orders and depreciation in price and quality of goods and before the matter is eventually settled, if it ever is settled, there have elapsed months, perhaps years, and considerable labor, back haulage or corrections of billing, and other things too numerous to mention, to be adjusted.

The decision of the I. C. C., June 23, 1913, that where merchandise is improperly addressed, the shipper making the error must bear the burden of the resulting freight charges and the fact that the correct address was noted on the bill of lading is not material, will go far towards making shippers more careful in marking their shipments properly, but there will always be a large amount of freight improperly addressed as long as shippers hire as shipping clerks boys who do not realize the importance of properly marking every package or clerks who are careless or inattentive to their duties. A good shipping clerk is a valuable asset to any firm.

The writer of this article is in a position where he has observed hundreds and perhaps thousands of errors similar to the above and is convinced that if shippers will instruct their shipping clerks to use extra care in checking the packages with the shipping order or bill of lading, before presenting goods to the railroad for shipment, a great improvement will be made in the overs, shorts and claims.

Furthermore, if the railroad receiving clerks will be careful to check the marks on the packages with the shipping order when received and the delivering agent will deliver only on presentation of bill of lading or other proof of ownership, the marks on the package not being a sufficient proof of ownership, as demonstrated above, a great deal of useless labor, expense and mis-delivery of packages can be avoided.

SAVING WASTE GRAIN

The Rock Island agent at the Silvis (Ill.) transfer, constructed a rat-proof grain bin last fall, holding 25 to 30 bushels of grain, and began systematically to save the grain recovered in the sweeping of empty cars placed at the platform for loading. This was done at practically no expense, as it was necessary to clean the cars before loading and regular employees were utilized in the work. As opportunity offered he also collected any grain spilled from bad order cars in the Silvis yards. This grain was sold from time to time and the receipts turned into the company treasury through the local agent. While this grain was damp and more or less dirty, it made good chicken feed and no difficulty has been found in selling it at $0.80 per hundred pounds. The amount recovered in four months was as follows:

November, 1914	$15.05
December, 1914	71.80
January, 1915	64.10
February, 1915	116.60
Total	$267.55

The Deniliquin Railways of New South Wales.—It is stated that the government of New South Wales contemplates taking over the Deniliquin & Moama Railway line, which forms the connecting link between the first-named town and the Victorian railway system at Echuca. Should this be done and the line be extended further northwards, and should the proposed line from Moulamein to Moama (immediately north of Echuca) be carried through, an enormous area of wheat land will be opened up.

Reclamation of Scrap on the Great Northern

Large Savings Made by Reworking All Wrought Iron Scrap Into Bar Iron at the Company's St. Cloud Mill

The geographical location of a railroad governs to a large extent the practices to be followed in the reclamation of scrap material. Some roads find it to their advantage to concentrate the classifying, reclaiming and salvaging at one principal point on the system, while other roads salvage and reclaim a great amount of material at the various shop points, leaving the classifying to be done at the scrap docks. This latter practice the Great Northern has found it expedient to follow, owing to the number and location of its shops; and its shop men are so trained that but little usable material finds its way to the general scrap docks. Thus it is only necessary to classify the scrap, salvaging

Fig. 1—Scrap Pile at St. Cloud, Minn.; Great Northern

what material is picked up from the road, such as track material, wreckage, etc., which is brought directly to the scrap dock.

The bulk of the scrap is received at St. Cloud, Minn., 75 miles west of St. Paul, where it is sorted and held for shipment to the scrap dealers, with the exception of the wrought iron scrap which is salvaged or worked over into first class bar iron in the rolling mill at that point. On the extreme west end of the system the scrap is classified and sold direct to the mills in that vicinity. By following this plan a large amount of cross hauling of the reclaimed material is eliminated, the stores department is relieved of a large amount of accounting, since the material reclaimed is turned directly into the local stock, and the shops receive direct credit for the amount of material they reclaim.

While the company has met with marked success in operating on this basis the chief point of interest is the reworking of the wrought iron scrap at St. Cloud. At this point the company operates a full fledged rolling mill for this purpose, and since it was started in August, 1913, it has reworked all of the wrought scrap originating on the entire system at a substantial profit. During the year 1914 this mill produced 8,863,835 lb. of bar iron, divided into various classes as follows:

Round iron, common	6,326,865 lb.
Square iron, common	42,780 lb.
Flat iron, common	1,852,635 lb.
Deformed iron, common (for reinforced concrete)	14,505 lb.
Hexagonal iron, refined	91,480 lb.
Round iron, refined	507,407 lb.
Flat iron, refined	28,163 lb.
Total	8,863,835 lb.

This was done at a cost of less than 90 cents per 100 lb., on an average, this figure including the cost of the scrap at current prices and all overhead charges, and it is conservatively estimated that a saving of over 25 per cent has been made on the market price of the iron rolled.

The mill is operated as a distinct unit and is under the direct jurisdiction of the superintendent of motive power in charge of shops. All the work connected with it is done on a contract basis, the standard rolling mill scale being followed consistently. The wrought scrap is sold to the mill by the stores department, as to an entirely independent concern, at the prevailing scrap prices, and the mill sells, as it were, direct to the stores department, charging for the material the cost of production, which includes the scrap cost and all overhead charges. This price is carried in all the general price lists and is changed monthly. As the mill is able to supply the needs of the system there is no confusion with the outside market prices. The work of the mill is done on a shop order basis, the orders being issued by the stores department for a sufficient quantity to warrant the changing of the rolls.

The workmen in the mill are all experienced mill men, it being found quite desirable to obtain them from other mills rather than to attempt to educate the local men to do the work. The force consists of one head roller who has charge of the mill and with whom the contracts are made, two roughers, two stranders, two finishers, one catcher, one hooker-up (these men pass the heated bars through the rolls), two heaters, two helpers, two

Fig. 2.—Wrought Iron Scrap Ready to Be Made Into Piles for Rolling Mill

straighteners, two shear men and four pilers, all of whom are paid out of the contract price.

The scrap as it is received from the system is shown in Fig. 1. It is classified from this pile and delivered to the scrap bins, with the exception of the wrought iron scrap. The rods in good condition and of a diameter generally used at different points, are cut to length, straightened and applied against any orders for such material. The wrought iron scrap which is not thus handled is cut to proper length for piling, sorted and delivered to the piling bench. Fig. 2 shows a pile of the smaller pieces just outside of the mill. As it is required it is shoveled through the window onto the piling bench shown in Fig. 3. Here it is made up into piles varying from 75 lb. to 250 lb. in weight. The flat iron is used for the sides and battens of the piles.

The wrought iron axles are sheared to length as shown in Fig. 4. This iron is rolled into what is known as the refined

iron mentioned in the output table given above. It is used for engine bolts, all rivets except those used in boiler work, and such other material as requires a better grade of iron. The iron made from the piles is known as common iron. The piles are heated in two large oil furnaces of the reverberating type, each having a capacity of 1,900 lb. per heat. These furnaces are located in front of the rolls, one on each side, and each furnace is used in rotation; that is, while one is feeding the rolls the other is heating its charge to the proper rolling heat. The heated piles are carried from the furnace to the mill, a rear view of

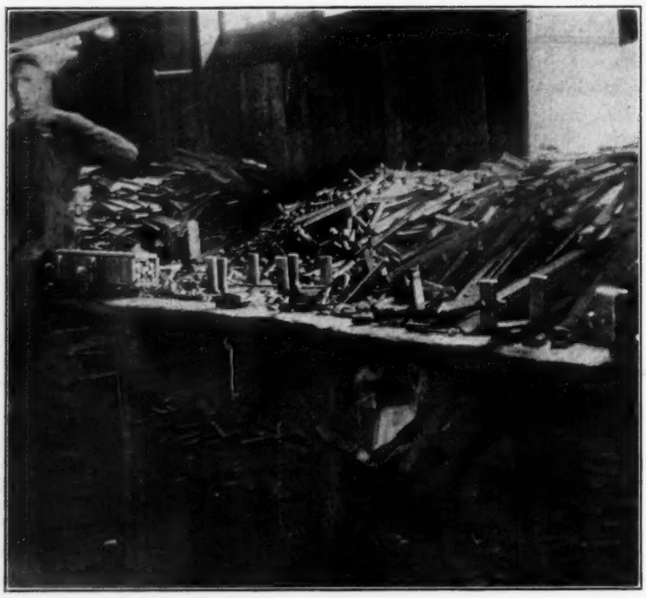


Fig. 3—Piling Bench at St. Cloud Rolling Mill

which is shown in Fig 5, by long tongs suspended from an overhead trolley which runs between the two furnaces and the roughing rolls shown on the left in the photograph.

The mill is what is known as a 12-in., three-stand mill, there being three sets of housings. The rolls in the different stands are connected by flexible couplings and the entire mill is driven by a 125-hp. Buckeye engine. The housings of the mill were built by the company and the rolls purchased from the United Engineering & Foundry Company, Pittsburgh, Pa. For the entire work of the plant 44 separate rolls are required. These are maintained in condition by a machinist, a special room being assigned

Fig. 4—Sheared Wrought Iron Axles Which Are to Be Rolled Into Refined Iron Bars

to this purpose (see Fig. 6). The rolls are such that the following sizes of bars may be rolled:

Round iron	½ in. to 1⅞ in.
Square iron	½ in. to 1½ in.
Hexagonal iron	⅞ in. to 1⅜ in.
Flat iron	¼ in. to 1 in. by 2 in.
	⅜ in. to 1 in. by 1½ in.
	⅜ in. to 1 in. by 1¾ in.
	⅜ in. to 1 in. by 2 in.
	⅜ in. to 1 in. by 2½ in.
	⅜ in. to 1 in. by 3 in.
	⅜ in. to 1 in. by 3½ in.
	⅜ in to 1 in. by 4 in.
	½ in. by 1⅞ in.

In addition to this deformed iron is rolled for concrete reinforcing bars. All but the ½-in. round iron is rolled to size in one heat. This is made into billets in order to produce the necessary homogeneity of metal for the small bar.

As the finished bar comes from the rolls it is placed on a hot bed. Bars have been rolled as long as 200 ft. The maximum output made by the mill is 75,000 lb. for one day (a day

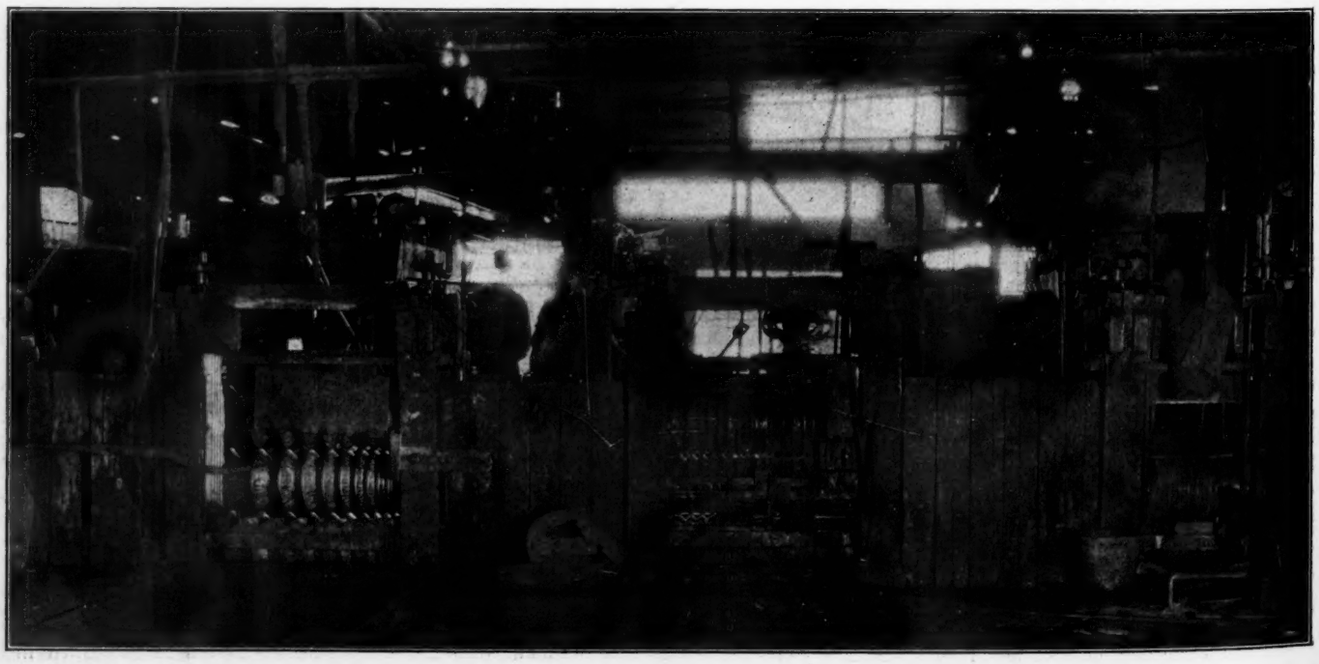


Fig. 5—Rear View of the Rolling Mill; Roughing Rolls on the Left

is governed by the run of the heats) and 1,480,000 lb. for one month. The bars are taken from the hotbed while still hot, passed over a series of large diameter rollers and cut to length, usually 16 ft., on an alligator shear. They are then weighed on track scales and placed in stock as shown in Fig. 7. The refined iron

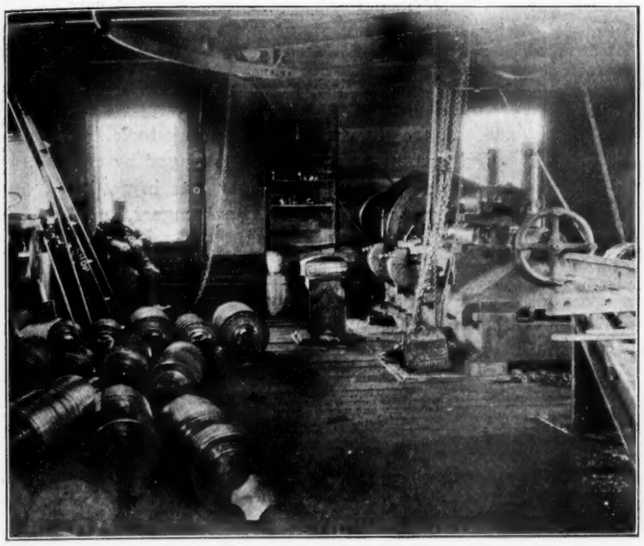


Fig. 6—Shop for Maintaining the Mill Rolls

is distinguished from the common iron by red paint on the ends. Taken as a whole the mill occupies a space 250 ft. long by about 45 ft. wide.

With all this material collected at this point it has been found expedient to manufacture bolts, rivets and grab irons at St. Cloud for the entire system. During the year 1914 over 1,600,000 bolts were made at an average cost per 100 lb. of $1.20 without nuts, this cost including the cost of the iron as produced by the mill, labor and the necessary overhead expense. In addition to this 322,740 ½-in. carriage bolts were made at an average cost of $1.60 per 100 lb. without nuts. One hundred and seventy-six thousand rivets were also made at an average price of $1.25 per 100 lb. boxed. This latter item alone represents a saving of over 300 per cent. The bolts and rivets under 9 in. in length are made in an automatic Ajax bolt machine which is fed directly from a furnace handling the 16-ft. rods. This machine will produce on an average of 1,500 lb. of rivets per hour and 4,000 bolts. Fig. 8 shows some of the carriage bolts thus made. The bolts over 9 in. in length are made on a continuous motion bolt machine, which will produce 1,200 bolts per hour.

As stated in the first part of this article the local shops do what reclaiming is possible. For instance, a group of machines

Fig. 8—Carriage Bolts Made on Automatic Bolt Machine

is used in the freight car repair shop at St. Cloud for reclaiming the bolts and nuts taken from the cars under repairs. It consists of a four-head threading machine, a small shear and a six-spindle nut tapping machine. Those bolts and nuts that are found suitable for use are placed directly in bins in the shop for immediate use. Those bolts that are slightly damaged are

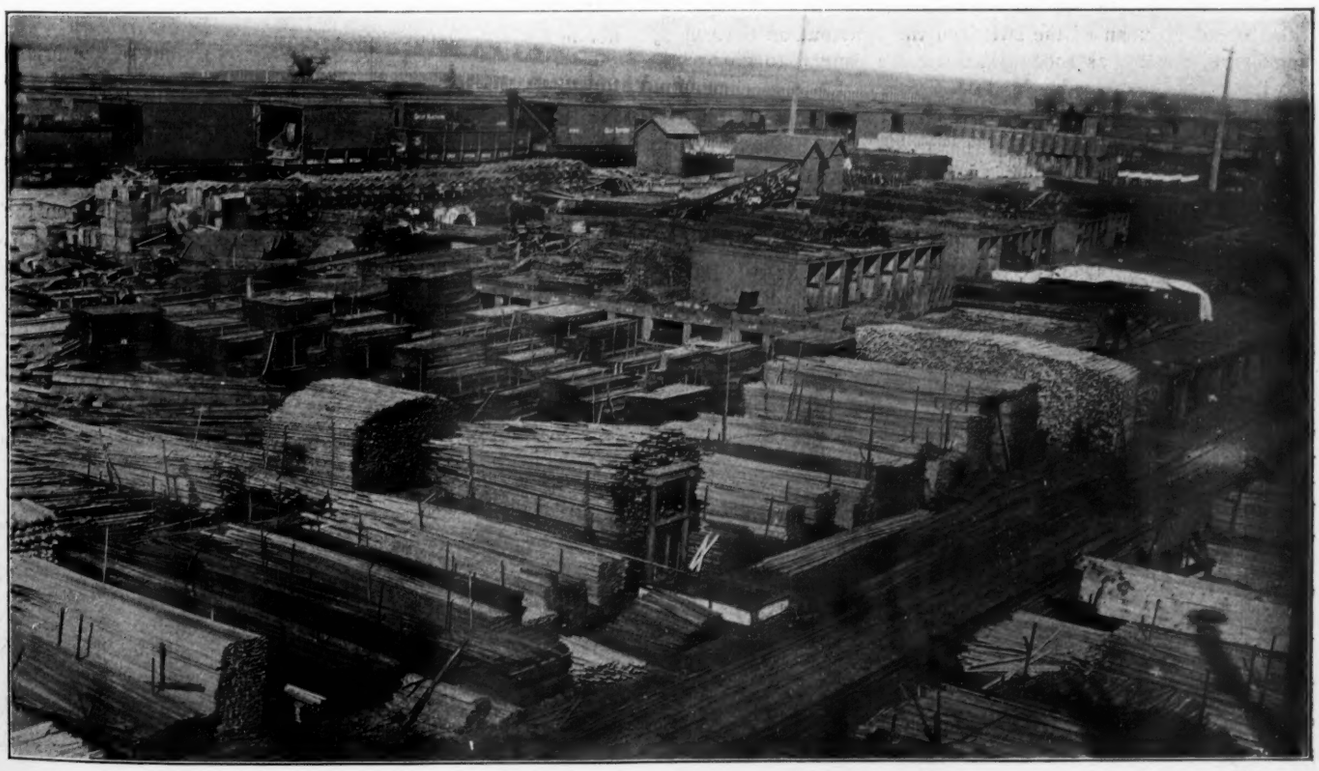


Fig. 7—Storage Yard for Finished Bar Iron

sheared off, rethreaded and placed directly in the available stock, and the nuts that are badly rusted are tapped and also made available for immediate use. Large quantities of bolts are thus reclaimed with all the otherwise necessary accounting and transshipping eliminated.

In addition to the manufacture of bar iron at St. Cloud the Great Northern makes all of its heavy bar iron from 2 in. up to 12 in. square for the system at its Dale street, St. Paul, Minn., shops under a 4,000 lb. hammer. The scrap is made into piles of 250 lb. and hammered into slabs and held in stock for shop orders for heavy bar iron. This shop slabs 11,000 lb. per day. In cases of emergency the material is worked into driving axles. The company also maintains its brass foundry at this point, where all the brass scrap is received and used. This foundry provides the necessary brass castings for the entire system and has a capacity of 15 tons.

TRAIN ACCIDENTS IN MARCH[1]

The following is a list of the most notable train accidents that occurred on railways of the United States in the month of March, 1915:

Collisions

Date.	Road.	Place.	Kind of Accident.	Kind of train.	Kil'd.	Inj'd.
1.	C. R. I. & P..... / C. & N. W.....	Cedar Rapids.	xc	F. & P.	1	8
31.	Cleve. & Pitts.....	E. Liverpool.	rc	P. & F.	0	1

Derailments

Date.	Road.	Place.	Cause of Derailm't.	Kind of train.	Kil'd.	Inj'd.
1.	Southern	Juliette	d. track	P.	1	1
1.	Boston & Maine.....	Pownal.	d. coupler	F.	0	0
4.	Central Vermont.....	Cambridge.	unx	P.	0	7
3.	Georgia	Buckhead	unx	P.	1	1
†5.	Atch. T. & S. F.....	Elsinore.	.....	P.	1	14
14.	Chicago & E. I.....	Shelburn.	unx	P.	1	2
16.	Macon & B.....	Upson, Ga.	unx	P.	0	5
23.	N. Y. N. H. & H....	Devon.	neg	P.	0	1
26.	Baltimore & Ohio....	Meyersdale.	b. wheel	F. & P.	0	4

The trains in collision at Cedar Rapids, Iowa, on the first, were a switching engine of the Chicago, Rock Island & Pacific and a passenger train of the Chicago & North Western, the switcher running into the passenger train, which was standing still. The engineman of the switcher, who was out on the running board, started, as soon as he saw the danger, to go back into the cab, but he was knocked off and killed; and eight other trainmen were slightly injured. The collision was due to the inexperience of the firemen, who was running the engine while the engineman was outside the cab.

The trains in collision near East Liverpool, Ohio, on the 31st, were an eastbound passenger and an eastbound freight, the passenger running into the freight. The caboose and three freight cars were damaged. One employee was injured. The passenger train, running under a permissive block signal, approached the freight, which had been stopped near the station, at uncontrollable speed.

The train derailed at Juliette, Ga., on the first, was southbound passenger No. 6, and the baggage and the express cars were overturned. The baggageman was killed and his helper was injured. There were 50 passengers on the train, none of whom are reported injured. The tender was the first vehicle to leave the track, and it is said that the cause of the derailment was a loose rail.

The train derailed on the Boston & Maine at Pownal, Vt., on the first, was a westbound freight, consisting of two engines and 70 cars. The train, moving about 30 miles an hour, broke apart at the eleventh car from the rear end by the failure of a draw-bar, which became loose in consequence of the loss of nuts from the yoke strap bolt. The separation of the cars caused the application of air brakes in emergency; and this caused such a shock that the fifteenth car from the engine was separated from the sixteenth by the pulling out of its draw-bar. This draw-bar, when it fell to the track, derailed the four following cars. One of the derailed cars struck the passenger station and demolished it, and another in the same way destroyed the freight house.

The train derailed near Buckhead, Ga., on the night of the third, was eastbound passenger No. 4, and four passenger cars were overturned. A freight car on a side track took fire and it, together with the locomotive, were badly damaged by the flames. The fireman was killed and one passenger was injured. In the four cars overturned were about 60 or 70 passengers, yet only one was seriously injured.

The train derailed near Cambridge, Vt., on the fourth, was an eastbound passenger, and two coaches fell down a bank. Four passenger, two employees and an express messenger were injured. The cause of the derailment was not determined.

The train derailed near Elsinore, Cal., on the fifth, was a southbound passenger. The rear coach had its rear truck derailed at a frog, just before reaching the bridge over the San Jacinto river. The truck slewed and pulled the car out of line and it was detached from the car ahead and was overturned, dropping about 17 ft. This car had a steel underframe and was but slightly damaged. One passenger was killed and the conductor and 13 passengers were injured. The train is said to have been running not more than 12 or 15 miles an hour, but the rail, on the curve (of 12 deg.), approaching the bridge was somewhat worn, and the roadbed was soft by reason of a heavy rainfall.

The train derailed at Shelburn, Ind., on the 14th, was the southbound Dixie flyer. The engine and three cars ran off the track and the station building was damaged. The engineman was killed and two trespassers were injured. The cause of the derailment was not discovered.

The train derailed near Upson, Ga., on the 16th, was mixed train No. 6, and one freight car, one mail car, the baggage car and two coaches fell through a trestle bridge 17 ft. to the ground below. The mail clerk and five employees were injured.

The train derailed at Devon, Conn., on the 23rd, was an eastbound express. The engine and first three cars ran off a derailing switch and stopped close to the abutment of the bridge over the Housatonic river. The fireman jumped off and was slightly injured. The train had run past distant and home signals set against it, and went off the derailing switch at about 10 miles an hour. The engineman at fault was a runner of experience, with a good record.

The trains involved in the wreck at Meyersdale, Pa., on the 26th, were an eastbound freight and a westbound passenger. The freight was derailed by the breaking of a wheel, and one car fell against the passenger train, which was passing on the adjacent track. Two passenger cars were badly damaged, and four passengers were injured.

[1]Abbreviations and marks used in Accident List:
rc, Rear collision——bc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc. ——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

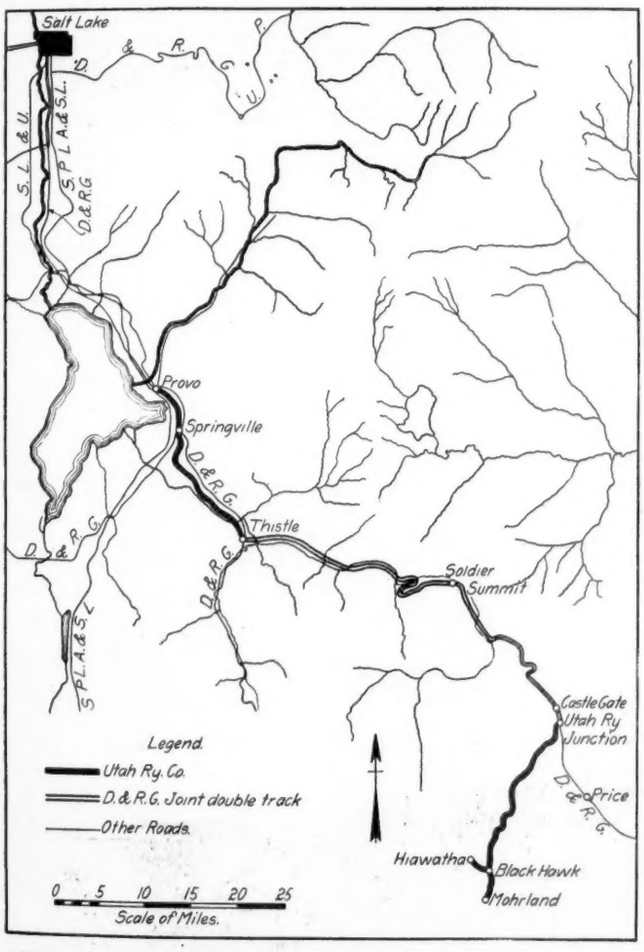
THE NEW FLAGMAN.—No flagman should be put on duty until he has learned the road and passed a satisfactory examination. The conductors should use care in working the new flagman, being careful they go back, carry the necessary signals with them; and to caution them in going back, especially at night, about how far they should go. Unless the new man is cautioned he will likely go back half the distance he should, partly on account of not knowing how far to go, poor judgment of distance at night, and for fear his train will go off and leave him in the woods. While we should never have in our employ a flagman so irresponsible as to make it necessary for the conductor to follow him and see that he does what the conductor tells him to do, yet I know of two cases in the past few years where, if this had not been done, collisions would have occurred.—*E. H. Daniel, in the Railroad Herald.*

Construction of New Line to Reach Utah Coal Fields

Required Movement of 100,000 Cubic Yards Per Mile, Much of Which Disintegrated Badly Upon Exposure

The Utah Railway Company was incorporated on January 24, 1912, as the Utah Coal Railway Company, which name was changed to the Utah Railway Company on May 4, 1912. The purpose of the organization was to construct a standard gage railroad from Provo to the coal fields of Carbon and Emery counties, Utah.

The coal fields to be served are a part of the Book Cliffs coal field, in the western extension of the Uintah coal region in the Rocky mountains, being, for the most part, that portion of this field south of the angle defined by the canyon of the Price river and lying along the easterly escarpment of the Wasatch range which forms the easterly rim of the Salt Lake basin. They are



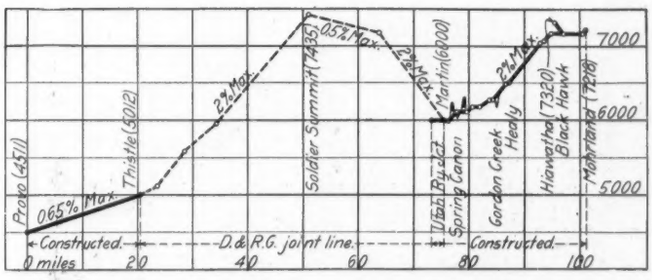
Map of New Line of the Utah Railway Between Provo, Utah, and Mohrland

known locally as the Castle Valley coal fields, Castle Valley being located at the base of the escarpment.

The coal outcrop in this section of the Uintah coal region is in the escarpment and at an elevation of 7,500 to 8,500 ft. above sea level, hence well up on the sides of or near the summit of the more elevated portions of the Wasatch range, making necessary the use of trams or other devices for carrying the coal from the mine openings to the tipples which are usually located near the foot of the escarpment. Coal seams in this section are usually nearly level, and carry little, if any, water.

Coal was being mined at the time of incorporation at Spring Canyon, Hiawatha, Black Hawk and Mohrland, as well as at openings along the Huntington river, capable of producing a large tonnage of a high grade of bituminous coal, for which there was a market. The output of these mines was limited and the marketing irregular by reason of insufficient railroad facilities. Three years previous, a line of railroad had been constructed from Price, Utah, to serve the mines at Hiawatha, Black Hawk and Mohrland, but it had proved inadequate for the requirements.

That portion of the coal field under consideration is cut through by the Price and Huntington rivers, and on account of the Price River canyon, Soldier Summit, Soldier Creek and Spanish Fork canyons being occupied by the Denver & Rio Grande, careful study was given the country for other routes, but Soldier Summit being the lowest summit available it was decided to encounter the difficulties consequent upon its use, as well as the use of canyons leading therefrom, occupied by an existing line of railroad, in preference to adopting a route calling for the crossing of the range by summits of a much greater elevation. In fact, the next lowest summit considered was at an elevation nearly 1,500 ft. greater than that of Soldier Summit, which has an elevation of 7,450 ft. above sea level. After careful study of the country by means of preliminary instrumental surveys it was decided to adopt a maximum grade of 2 per cent compensated for curvature, and a maximum curvature of 8 deg.;



Profile of New Line of Utah Railway and Joint Line with D. & R. G. Over Soldier Summit

all curves having a radius of less than 2,865 ft. being spiraled for a speed of 25 miles per hour.

The country traversed between Provo and Thistle presents no unusual features, about two-thirds of this distance being along and upon a bench of cultivated land said to have been formed by wave action of an ancient lake, while the remaining one-third is in the canyon of the Spanish Fork river alongside the D. & R. G. track and near the bottom of the canyon.

From Utah Railway Junction to Mohrland the line as located is just outside the foot of the abrupt slope from the projecting sandstone-capped promontories or fingers of the escarpment. The country at the foot of the cliff-like escarpment slopes rather abruptly to Castle Valley and at intervals is deeply cut by drainage channels, none of which, with the exception of Gordon Creek show a surface flow, except after storms or during periods of melting snow. Most of these channels show evidence of rushes of water in considerable volume, which, by reason of the steep slope, have moved many boulders which are profusely distributed along the drainage courses. The shale which forms most of the ground surface that is not denuded sandstone, disintegrates under exposure to such an extent that it gullies freely under a flow of water, resulting in an uneven washing and wearing down of the surface, leaving it in the form of heavy corrugations deeply cut by gullies with steep slopes. Many of these gullies have cut down to ledges of sandrock which form the floor of the wash, while at places during storms the water rushes over the outcrop of these ledges forming water falls of considerable

height. To the east and 1,500 to 2,000 ft. below the line can be seen the comparatively level Castle Valley, some six miles distant.

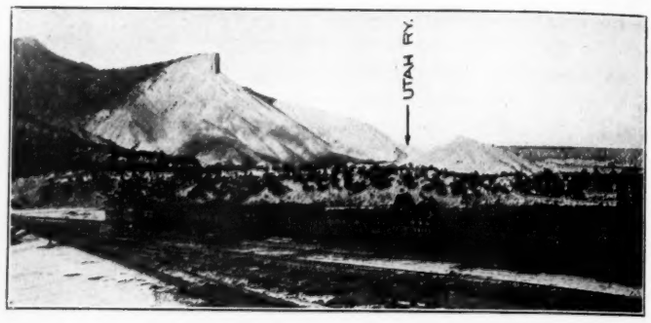
As the surveys progressed and the possibilities of the country developed it was decided to fix the western terminus of that portion of the line to be constructed at that time, at Provo, Utah, in the Utah valley, 48 miles south of Salt Lake where a junction was possible with two steam lines, the Denver & Rio Grande and the San Pedro, Los Angeles & Salt Lake, and one electric line, the Salt Lake & Utah, all of which have direct lines with favorable grades between that point and Salt Lake or Ogden.

In fixing the location of the line between Thistle and Castle Gate traversing the deep, narrow and crooked canyons of Spanish Fork river, Soldier creek and Price river, with the restrictions as to grades and elevation mentioned, care and patience was necessarily exercised. The fact that the D. & R. G. has a through line, double-tracked for a portion of the distance, located for the most part in the bottom of these canyons, was something of an obstacle in addition to the extreme roughness and mountainous character of the country traversed, but the interests back of this project at no time lost sight of the desirability of securing a line that could handle economically the traffic of a heavy output from the coal fields to be served.

Typical Construction Work North of Blackhawk

Grading on this line was begun near Mohrland, the southern terminus, in September, 1912, and near Thistle in November of that year, although at that time the location of the line on several sections had not been fixed and several revisions and modifications were afterwards found desirable. After the location of the entire line had been substantially fixed and construction started at both ends, negotiations were entered into with the D. & R. G. with a view to avoiding, as far as possible, interference with its existing and operated tracks. These negotiations finally developed into an arrangement whereby the D. & R. G. improved its line and completed a second track between Thistle and Helper with favorable grades and curvature, with an arrangement under which this trackage could also be used by the new company. It was also arranged for the D. & R. G. to use jointly the Utah Railway trackage under construction between Provo and Thistle. As this arrangement provided trackage for the Utah Railway Company from Thistle to near Castle Gate, over D. & R. G. property and tracks, no construction was started between these points, construction being confined to that portion of the line between Provo and Thistle, and between Castle Gate (Utah Railway Junction) and Mohrland.

Between Provo and Thistle, 20.7 miles, the line was so constructed as to permit of its being used as an east bound track by the D. & R. G., with a maximum grade rate of 0.65 per cent against east bound traffic, and a maximum curvature of 4 deg.

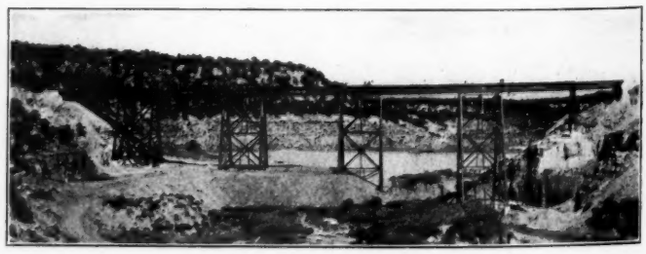


Looking North from Blackhawk Along the Utah Railway

Where practicable, conforming with the above standards, it was constructed alongside the operated track, which was in part reconstructed and modified to conform therewith. For about one-third of this distance it was necessary to detour from the operated line to a maximum distance of about one mile.

The principal features of interest on this part of the line consisted of changes in the channel of Spanish Fork river and the rectification of the main line and other trackage of the D. & R. G. between these points. The construction of this 20.7 miles was supervised and handled by the D. & R. G. in behalf of the Utah Railway Company, and the track was laid and put in operation as an east bound track for the D. & R. G. August 1, 1914.

Although construction on a connection with the D. & R. G. between Castle Gate and Helper, designated as "Utah Railway Junction," and Mohrland, 26 miles, was commenced at Mohrland in September, 1912, the final location of this portion of the line was not completed until the spring of 1913, when the entire work was placed under construction. This location, although made with care, called for an unusual percentage of curved line, about 46 per cent of the total length being curved and over 62 per cent of this curved line being on curves of 6 deg. or over, the total angle in the 26 miles of line being 3,090 deg. 56 min.



The Gordon Creek Steel Girder Viaduct on the Utah Railway

On account of the extremely rugged nature of the country, the surface of which consists largely of sandrock and black shale common to the coal formations in this section of the mountains, some heavy and expensive work was necessary to secure a railroad of the type desired. In view of the high cost of grading consequent upon the irregularities of the country, efforts were made to so fix a location as to give a fair balance to the excavations and embankments, as on many sections of the line little or no borrow was to be obtained except by blasting.

Although the shale which constituted a large per cent of the

excavated material had an earthy appearance upon the natural surface, when penetrated it developed a hard, almost rocky nature, quite difficult for drilling and blasting, although upon exposure to the atmosphere, it frequently crumbled rapidly into an earthy form. Large masses of this shale rock taken from the excavation and placed alongside the grade would crumble in a few months to a mound of earthy material, giving little indication of its formidable character to the grading forces, or the expense required for its removal. Swelling of the material removed from an excavation was frequently as much as 50 per cent, yet after a few months' exposure it would slack and shrink to nearly its original bulk. Culverts and other structures placed under embankments of this material were affected by this unstability, in some cases quite unfavorably, as, dependent somewhat upon the manner in which the material was placed, different action would result, the swelling and shrinking sometimes resulting in the movement of certain parts of certain layers of the embankment. In one or two cases where embankments built of this material abutted on solid formations, by reason of this resistance portions of these embankments seemed actually to creep up-hill in their efforts to expand during the swelling period.

As to future permanency of embankments constructed of this unstable material, it is the opinion of those most familiar with its characteristics that the outer portions of these embankments will disintegrate or slack upon exposure to the atmosphere, thereby filling the interstices of the broken material underneath to such an extent that continued slacking will not proceed to a great depth into the embankment, but that the outer surface will in effect be sealed by the slacking of the more exposed portions and that thereupon further disintegration will take place slowly, if at all.

While usually massive and coarse sandstone was encountered, occasional layers were found that might be termed a good grade of building stone. The larger portion of this sandstone seems to partake somewhat of the nature of the shale with which it is associated and it is not unusual to find heavy layers of this sandstone, the surface of which slacks and crumbles quite freely after exposure to the atmosphere for a few months.

The grading of the roadbed for this 26 miles of single track railroad called for the moving of slightly over 2,673,000 cu. yd. exclusive of 1,638 lineal feet of single track tunnels. Of these roadbed quantities about 62 per cent was classified as solid rock, 26 per cent as loose rock and 12 per cent as earth. The tunnels, 835 and 803 feet long, respectively, were both on 8-deg. curves, through rock and shale formations. No water was found in driving these tunnels.

On account of the aridity of the climate, no unusual drainage features were encountered. Only one bridge was required to serve drainage. This was at Gordon creek, which is in a deep gash or gully where crossed by this line. While the normal flow of this stream is not over 20 sec. ft., it is subject to rushes of water from summer storms or cloudbursts which indicate at times 4,000 sec. ft. The bridge or viaduct across this stream has a height of 135 ft. above the creek bed, and a length between back walls of end abutments of 624 ft. The bridge consists of 5 spans of 80 ft., and 1 span of 60 ft., deck plate girders supported by 1 steel bent and 4 steel towers, these towers carrying 40 ft. steel girder tops. The entire bridge is on a 6 deg. curve. Over Spring Canyon creek two 60-ft. deck plate girders were used, this crossing serving for drainage as well as for a branch line of railroad underneath. One temporary wooden bridge 105 ft. long was used over the Southern Utah Railway, the uncertain future of that line of railroad not justifying a permanent structure at the crossing. For mining waterways, rock wall culverts, arch and box type, or beam girders on concrete walls were used, as well as cast iron pipe with rock end walls. The largest arch used was a 16-ft. span with a length of 175 ft.

The roadbed for one foot or more in depth, as was thought necessary, was formed of selected material, which was hauled considerable distances in some cases. Before the track was laid this was brought in by teams, and after track had been laid by trains. While this selected material was in no case first class for the purpose, it served to cover and protect the shale and to a great extent retard or prevent its disintegration, and to form a reasonably firm and somewhat elastic roadbed to shed such moisture as was likely to fall thereon and upon which the track has been successfully maintained at a reasonable cost to date. There being no natural ballast available in this section of the country, no ballast was used, the track being put to line and surface with the roadbed material. It is to be expected the embankments built of shale will continue to settle and shrink, which will in some cases call for raising and resurfacing of the track. Should these settlements cease or become unimportant, ballasting may thereupon seem justified, but it was thought that the use of expensive ballast hauled long distances would not be justified upon these settling embankments so long as the track could be maintained thereon at a reasonable cost without ballast.

The main track was laid with 90-lb. A. R. A. type "A" rail, with Bonanza joints and 18 7 in. by 8 in. 8-ft. ties per 33-ft. rail. Sidings and spurs were laid with 75-lb. rail. Two steel water tanks, each of 50,000 gal. capacity, were erected.

The grading, tunnelling and work connected therewith was done under contract with the Utah Construction Company of Ogden, Utah. The steel bridge material was furnished by the American Bridge Company of New York and erected by Gerrick & Gerrick Company of Seattle, Wash. Track laying and surfacing was done by company forces. H. S. Martin was in charge of construction work under the direction of William Ashton, chief engineer.

WESTERN RATE ADVANCE HEARING

Testimony of protestants against the proposed advances in the rates on livestock occupied the hearing before Commissioner Daniels at Chicago in the western rate advance case throughout most of this week, the testimony on packing house products having been concluded on April 30. This will be followed by some unfinished testimony of protestants, and the hearing is expected to be concluded on May 10.

R. O'Hara, rate expert for Swift & Co., presented 31 exhibits to show that the increases on packing house products should not be allowed. He disputed statements by railroad witnesses regarding the percentage of empty car mileage in the packing house business, saying that for all the roads in the case for the year ending June 30, 1912, the percentage of loaded car mileage was 71.09, and for the year ending June 30, 1914, the loaded mileage for the Swift Refrigerator Line was 55.4 per cent. He said the proposed advances would add $488,747 to the annual transportation charges paid by Swift & Co., that it is extremely doubtful that such an advance could be passed on to the consumer, and that it seems likely that the livestock shipper would have to bear the burden.

W. W. Manker, assistant traffic manager for Armour & Co., presented 29 exhibits, in which an effort was made to show that the rates on packing house products are amply remunerative and pay a much greater revenue per ton mile than the average of other commodities. The present advance, he said, would disturb an adjustment as between the rates on livestock and fresh meats and packing house products which has been approved by the federal courts, and that in the advances proposed there is no uniformity shown. Mr. Manker said that the total amount of freight charges paid by Armour & Co. on materials and supplies used in the operation of its plants was $1,841,899 in 1914, and included in this list of supplies are several commodities on which the rates have been advanced. In addition the increases on fresh meats and packing house products would cost this company, he said, $415,784 a year. He disclaimed knowledge of the capitalization or dividend rate of his company.

C. O. Cornwell, assistant traffic manager of the Cudahy Packing Company, claimed that the proposed rates would be discriminatory and would disturb existing relationships, and said he did not believe the carriers had made a careful and con-

scientious effort to adjust the proposed advances upon any equitable basis, while they would limit the volume of the movement of packing house products in parts of the territory.

A. F. Stryker, secretary and traffic manager of the Live Stock Exchange of South Omaha, based his chief protest on the fact that it was proposed to advance rates out of Omaha 3½ cents, while the Chicago & Alton and the Wabash have contracts with the packers for rates from Kansas City which already give that city an advantage of 5 cents over Omaha, and the proposed rates would increase Omaha's disadvantage to 8½ cents. The difference in rates militates against Omaha, he said, because cattle raisers can obtain better prices in Kansas City on account of the lower rates on the product.

A. B. Caswell, manager of the Milwaukee Tanners' Freight Bureau; J. F. Nicholas of Charles Friend & Co., Chicago, and W. V. Hardie of the Oklahoma City Chamber of Commerce, protested against the proposed advance in the rates on hides.

H. G. Krake, commissioner of the Traffic Bureau of the St. Joseph Commerce Club, protested against the disadvantage under which the St. Joseph market operates in competition with Kansas City, and also against the increase in the rates on hides.

Fred Pettijohn, a cost accountant associated with the Mutual Audit Company of Louisville, submitted an extended analysis of the operating expenses of the Chicago & Alton for the month of October, 1914, to show the cost of transporting meat. Of a total operating expense on the western division for the month of $290,498, he assigned $215,981 to freight and $40,089 to fresh meats and packing house products; whereas the gross revenue received by the Alton on this traffic was $70,583. Out of this he said the road paid switching absorption amounting to $7,658, leaving a net revenue of $62,925. Adding to the operating expense $11,704 to cover hire of equipment and $89.96 as the proportion of train cost on company material, he obtained $51,884 as the total cost chargeable against the packing house traffic; or 6.69 mills per ton-mile against a ton-mile revenue of 11.24 mills. In other words, he said the Alton handled this traffic at an operating ratio of 59.48 per cent, making a profit of 40 per cent. From a similar analysis of the Northwestern traffic and expenses he figured a profit of 36 per cent on a relative smaller volume of tonnage because of the higher rates. Mr. Pettijohn was cross-examined at length by Dr. M. O. Lorenz, statistician for the Interstate Commerce Commission, and by C. C. Wright, general solicitor for the Chicago & North Western, who seriously questioned some of the methods used by the witness in making his calculations.

"By whom are you employed in this case?" asked Mr. Wright. "Clifford Thorne employed me to work up the packers case," replied Mr. Pettijohn.

"Are you employed for and in behalf of all these large packing concerns?" asked Mr. Wright. "I couldn't tell you, Mr. Wright, who all the packers are behind this movement; the check comes through M. Thorne."

Mr. Thorne then stated that the money was given by the packers to pay Mr. Pettijohn and all his assistants. "The attorney for the packers gave the money," he said, "and his name was Luther Walter. I know nothing further."

"The money was contributed by the packers, Armour & Co., Swift & Co., Morris & Co. and Sulzberger & Sons Company," said Mr. Walter.

C. S. Balch, statistician of the Chicago & North Western, testified in rebuttal of the statements made by accountants for the protestants as to the cost of operation. He said that investigation showed that on all the cars moved by the North Western out of South Omaha to Iowa, Illinois and Wisconsin for November, 1914, the earnings, after taking out the switching charges at Chicago and Omaha, equaled only $52.99 per car, and that taking the figure of 10.1 cents per car mile arrived at by the witnesses for the protestants as the cost of hauling each car one mile, it would cost $49.60 to haul a car to Chicago, leaving a net of $3.39 to pay taxes and overhead charges, on an operating ratio of 93.7 per cent.

F. A. Leland, chairman of the Southwestern Tariff Committee, also testified in rebuttal, pointing out objections to the exhibits filed by witnesses for the packers and replying to their objections to the exhibits he had filed in his direct testimony. He also submitted a number of supplementary exhibits.

The first witness on behalf of the protestants against the advances in the rates on live stock was T. W. Tomlinson of Denver, secretary of the American National Livestock Association. He said the proposed advance is an attempt on the part of the carriers to shift the burden of transportation to the interstate shippers, and presented a number of comparisons to show that the present rates, as well as the proposed rates, are much higher than the rates for similar distances under the Illinois, Iowa, Missouri, Kansas and Texas state tariffs. He also said that many of the proposed rates are higher than the rates approved by the Interstate Commerce Commission in the Oklahoma City case. He said that the cost of expedited special service, as claimed by the railroads, is "largely mythical"; that there has been no improvement in the service given live stock traffic within recent years; that on the contrary the time schedules have been lengthened. He also claimed that live stock moves in trains that carry as a rule as much revenue tonnage as the average of all trains, and that the large empty movement of live stock in cars is explained by the fact that there is a surplus of box cars moving westbound, and there is no necessity to load live stock cars as long as that condition exists. "The present rates on live stock are higher than ever before in the history of the industry," he said. "I estimate that shippers of live stock now pay directly or indirectly from 20 to 25 per cent more for marketing their stock than they did 15 or 20 years ago. This increase has been caused by flat advances in the rates themselves, by higher charges for feeding in transit, by the withdrawal of rebates, by the withdrawal of free transportation formerly accorded buyers who wished to go out to pick up stock, and by the change in rates from charges per car to cents per hundred pounds."

C. B. Heinemann, assistant traffic manager for Morris & Company, also testified in opposition to the advances on live stock in southwestern territory. He took the position that the existing basis of rates has been adjusted upon a schedule prescribed by the commission, and that the rates were ample to cover the carriers' necessities. He offered exhibits to show that the carriers had not followed out the commission's suggestion that rates on feeder stock be 75 per cent of the beef cattle rates, and said he believed the scale prescribed by the commission in the Oklahoma City case, if properly observed, would give the carriers all the compensation which they could reasonably expect.

W. W. Manker, assistant traffic manager of Armour & Co., also testified against the proposed increase on live stock in southwestern territory, contending that the rate scale fixed by the Interstate Commerce Commission is higher now than the state rates and that the difference would be increased by an advance.

J. D. Jackson, president of the Cattle Raisers' Association of Texas, testified that the cattle industry is in no position to pay higher transportation charges, and that there has been no material change in the conditions to justify an increase in rates. Similar testimony was given by H. A. Stonebreaker, a member of the executive committee of the American National Livestock Association.

THE ENGLISH RAILWAYS AND THE GOVERNMENT.—The Board of Trade has announced that under a new agreement between the government and the railways which have been taken over under the Act of 1871, 25 per cent of the war bonus granted to railway employees will be borne by the companies. It has also been agreed that in future the compensation payable to the companies by the government during the period of control shall be the sum by which the net receipts of the railways during that period fall short of the aggregate net receipts for the corresponding period of 1913, without any reduction.

The Rivers and Railroads in the United States*

The Considerations That Should Lead to the Development of Railroads Rather Than the Building of Canals

By F. Lavis
Consulting Engineer, New York

The paper on the above subject by Wm. W. Harts (abstracted in the *Railway Age Gazette,* February 5, 1915) calls very timely attention to one of the problems of the economics of transportation which is often misunderstood or entirely ignored. This ignorance or misunderstanding has resulted in the expenditure of a great deal of money without adequate benefit, and not only has this been the case in the past, but it still continues. Our national policies in these matters seem to be too often conceived in a generally haphazard manner, rather than to be founded on sound economic laws, and in the general development of the whole resources of their countries certain European nations seem to be guided by more orderly processes of thought and action than we are. But even in Germany, the greatest exponent of order and system, it is by no means a fact that the development of its waterways has resulted in the attainment of unqualified success in low costs of transportation thereon. It has frequently been assumed that this is the case, but it has been shown† that in Germany, as elsewhere, many of the items which should be included in the cost of water transportation have been omitted. Such success as *has* been attained, however, has been largely due to the fact that the matter of deciding on the projects on which public moneys shall be spent has been generally left to a comparatively small body of men of training and experience in the particular class of work or problems involved, whereas, in the United States, this is generally decided by the votes of the people.

It is probably true that in the development of their waterways some of the European nations have attained a greater measure of success than we have, but in the general realm of transportation, including that by railways, it is undeniable that we have far out-distanced the rest of the world. This success has, generally speaking, been the result of policies formulated by a few men or by small groups who have brought our railroads to the high plane of efficiency on which they rest today. *Rest* is used advisedly, as apparently the initiative which has achieved these results is now held in abeyance by the passing of the control of our transportation systems into the hands of those charged by the state with their regulation and who have not the personal incentive to strive "to make a dollar earn the most interest."

Under our form of government it is inevitable that the final decision in regard to the expenditure of money for public improvements must rest on the approval of the people as a whole, and it is perhaps too much to expect that any large proportion of them can be so educated as to be able to form independent judgments on all matters of this kind.

The State of New York is just about completing a new canalized waterway from the Great Lakes to the navigable waters of the Hudson river at a cost of approximately $130,000,000 or more. The construction of this canal was authorized by vote of the people of the state only a few years ago, and apparently they were influenced by two arguments, both of which are, in the writer's opinion, fallacious. These arguments are: (1) That by providing competition the canal would compel the railroad lines to keep freight rates down, and (2) that the actual cost of transportation would be less by the canal than by railroad.

It does not seem necessary at this time to go into much detail to show how these arguments fail. The theory of competition is scarcely tenable, in view of the almost absolute control of railway rates by both state and federal regulation. The actual cost of transportation by canal is only less when the interest on the investment in the canal and the cost of its administration and maintenance is ignored in calculating it.

Taking into consideration the interest on the investment and the cost of maintenance, amounting to 6.6 mills per ton mile, it has been shown* that the total cost of transportation on the Erie canal is about 8.6 mills per ton per mile, and this for low grade, bulk freight alone, whereas the freight receipts of the New York Central were only 6.2 mills per ton mile for all classes of freight, indicating a considerably lower figure even than this for the low grade bulk freight.

It is also shown that the cost of construction of the old Erie canal was not less than about $165,000 per mile, and the new canal will cost double that, which may be compared with the capitalized value of the New York Central Railroad at about $180,000 per mile.

Prof. Engels, an eminent German authority, has stated† that to improve a German river involved an expense equal to that of building a double track railroad on easy gradients through a mountainous country; that is to say, from $100,000 to $150,000 per mile.

The question of the value of waterways for the purpose of providing competition for the railways is very ably discussed‡ by M. Colson. an eminent French authority, who uses as an illustration a specific case in France where the relations are apparently somewhat similar to those of the New York Central and the Erie canal. The argument is paraphrased to fit this latter, with which we are all familiar. It is argued that if lower rates were the desired object, there is probably no doubt that if the New York Central had been presented with, say, one-half the cost of the barge canal, and half the estimated annual cost of administration and maintenance, it would have been glad to guarantee a freight rate of 2 mills per ton mile (the actual net transportation cost on the canal) on such items of bulk freight as may be expected to pass through the canal during the season the canal is open. The lower rates would thus be secured and the state would have saved many millions of dollars. Probably, however, there would be a great outcry and protest against the subsidizing of a particular railroad to obtain a reduction of rates in a certain local section, without obtaining the same reduction in the rest of the country or state, yet this is really what is done, except that the cheap rates are obtained for a certain small part of the population by spending the money for a canal rather than by giving it to the railroad.

The importance of a study of the questions raised by the author of the paper needs no argument, especially in view of the existing financial and economic crisis. All who have broad knowledge of the newer civilizations, that is, those of North and South America, as well as Africa, Australia, etc., cannot but be impressed with the tremendously large number of important things to be done, and the difficulty of getting money enough to carry out even a small part of them, including often those of considerable merit. The Balkan war

*Abstract of a discussion in the March Proceedings of the American Society of Civil Engineers.

†Waterways and Railways, by H. G. Moulton.

*Cost of transportation on the Erie canal, Bulletin of the Bureau of Railway Economics, 1911.

†Eng. News, Jan. 21, 1915, p. 116.

‡Bulletin Int. Ry. Congress, Nov., 1913, p. 958.

and the present European war, so far as their effects have any bearing on the financial situation, are but the culmination of a vast and far-reaching crisis in the affairs of the world produced by the great *demands* for capital for legitimate and urgently required developments of new countries, and the totally inadequate *supply*. It is, therefore, doubly necessary *now* that the greatest care be exercised in selecting for development only those projects which are sound when judged from the broadest economic viewpoint.

So far as concerns the conclusions of Mr. Harts that it is time that we awoke to the wastefulness of much of the expenditure for improvements of rivers and to the desirability of applying the money towards increasing the facilities and depth of water in our ocean ports, the writer is in entire agreement.

The development of our ports must be planned on an adequate basis to take care of a large overseas commerce, and our interior lines of communication must be so developed to carry our products from one part of the country to another at the lowest possible cost per ton mile. In the present state of the art, with possibly a very few exceptions in respect to certain natural deep inland waterways, the railway is the best and cheapest means of inland transportation of which we have knowledge, and unless there is a distinct revolution along lines as yet undreamed of, is likely to remain so for some time to come.

Mr. Harts also referred to the three stages in the economic development of inland water routes, the first before the advent of the railroads when the waterways provided practically the only means of access and communication, and when owing to the rapid growth of the country they were prosperous; the second, the era when the competition of the railroads almost entirely superseded water transport, and the third looking forward to a time when the waterways of this country may be utilized to some such extent as they are in many parts of Europe as almost equal in importance to the railway companies as lines of transportation for low grade freight.

We cannot of course say that this third era will *never* develop in this country, but it seems somewhat improbable, if the development of the art of transportation by railway continues to develop in the future to any such extent as it has in the past. In Europe the railways have never entirely superseded the rivers and canals or offered the effective competition they have in this country, and it must be remembered that a great many of the mercantile and industrial centers of Europe were built up along the water routes and established there long before the advent of the railroads. Of course many of the largest of the modern industrial and manufacturing enterprises have grown up coincidentally with the railways, but the majority of them are but developments from those of an earlier period, built up alongside navigable rivers and canals.

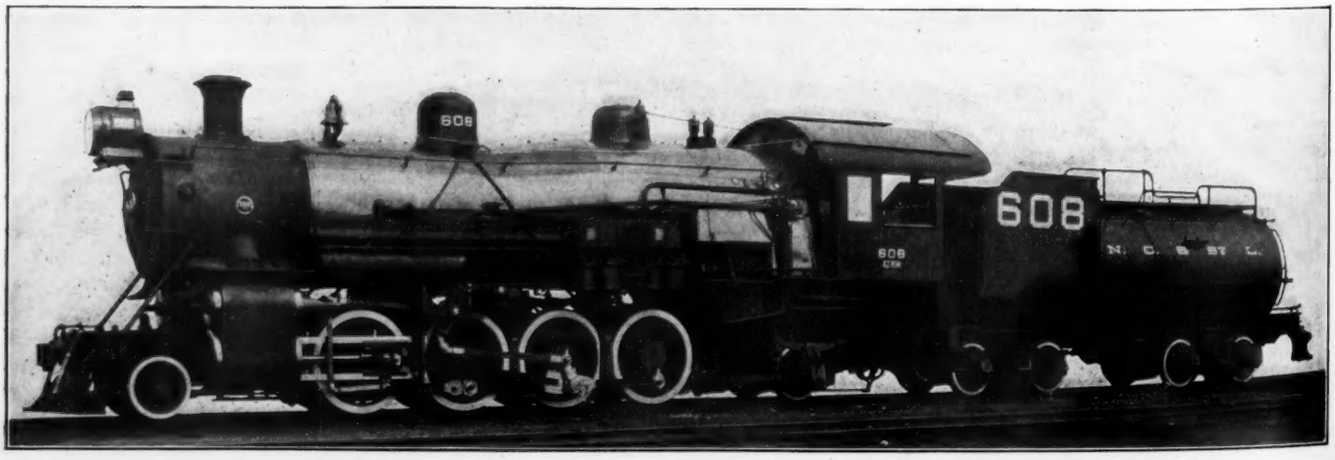
Another point of considerable difference is that in Europe, society and the industries, having been organized before the advent of the railroad as the primary agency of transport, were developed as a number of comparatively small self sustaining groups that is, self-sustaining so far as concerns the necessities of life. In the United States, however, the development of the railway as an efficient and cheap means of transport, reaching all parts of the country, before the development of the principal industries, has enabled these latter to be located where the soil, climate and other conditions were best suited to them, and then to distribute the finished product to the point of consumption.

In the United States the country has been developed by the railways, and while many industrial establishments have been so located as to enjoy the benefits of both rail and water transportation, the railway is always of paramount importance. In spite of some adverse criticism of some details and of some of the figures used, the statement of Mr. James J. Hill that, in comparison with the rates of wages, the cost of freight transportation on the railways of this country is only from one-third to one-quarter as much as in Germany, is undoubtedly substantially correct. Taking into consideration, therefore, the limitations of flexibility of water transportation routes, the necessity that business shall come to them and that they can seldom if ever be carried to the business, the fact that some cargoes, notably coal, deteriorate from wet and dampness, that there are other inherent difficulties in connection with inland water transport, increased hazard, and insurance rates, and considering the efficiency of our railroads, there seems little reason to expect now that there will be any general development of fluvial or canalized inland transportation, unless there is a revolution in methods which are entirely beyond any present expectations, and which, therefore, it is useless to attempt to provide for.

MIKADO AND PACIFIC TYPE LOCOMOTIVES OF MODERATE SIZE

The Baldwin Locomotive Works has recently completed ten Mikado and six Pacific type locomotives for the Nashville, Chattanooga & St. Louis, and although not particularly large for their respective types, the engines are interesting examples of modern motive power.

The Mikado type locomotives exert a maximum tractive effort of 49,400 lb., and with a weight on drivers of 205,000 have a factor of adhesion of 4.15. They are equipped with Schmidt superheaters and Security sectional arches, and are so designed that Standard stokers can be subsequently applied if desired. The firebox throat has a depth of 24 11/32 in., measured from



Mikado Type Locomotive for the Nashville, Chattanooga & St. Louis

the underside of the barrel to the bottom of the mud ring. The tubes are electrically welded into the back tube sheet.

The cylinders are arranged with outside steam pipes, and the steam distribution is controlled by 15-in. piston valves which are set with a lead of 3/16 in. Neither relief nor by-pass valves are used. The valve gear is of the Walschaert type, controlled by the Ragonnet power reversing mechanism. The pistons have cast steel dished bodies with iron bearing shoes cast on, the width of the piston head being 5¼ in.

The locomotives are equipped with Cole long main driving boxes, and with the latest design of Hodges trailing truck, the spring rigging being cross-equalized between the rear driving wheels and the trailing truck. This is accomplished by pinning together, on the center line of the locomotive, two transverse beams, one of which is connected by links with the rear driving springs, while the other is connected with the rear truck equalizer. It is claimed that this construction assists in maintaining a correct weight distribution on both sides of the locomotive when passing over uneven places in the track, and that it also reduces stresses on the frames and equalizing gear.

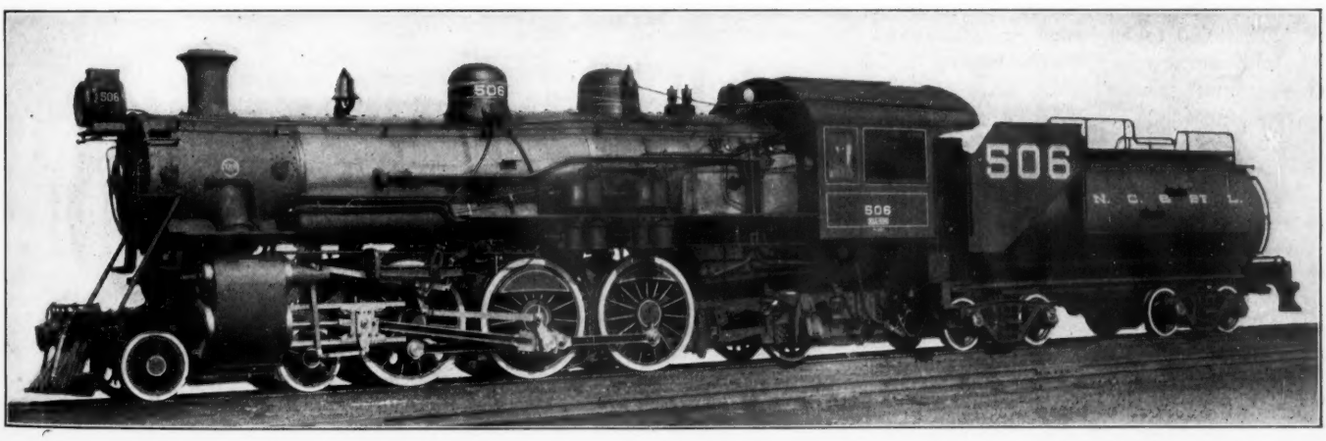
The Pacific type locomotives are in general similar to the Mikados, although they have smaller cylinders and boilers, and the wheel loads are somewhat lighter. The tractive effort exerted is 33,800 lb., with a ratio of adhesion of 4.25, the weight on the drivers being 143,500 lb. As in the Mikado type, the spring rigging is cross-equalized back of the rear driving wheels. The boiler center line is 9 ft. 6 in. above the rail, which allows room for a furnace throat as deep as that applied to the Mikados. The Schmidt superheater and Security brick arch are used in these engines also.

The tenders of both locomotives are of the Vanderbilt type, carried on Standard forged and rolled steel wheels. The engine truck wheels are steel tired and of the same make.

The tables contain the leading dimensions of both types:

General Data		
Gage	4 ft. 8½ in.	4 ft. 8½ in.
Service	Passenger	Freight
Fuel	Soft coal	Soft coal
Tractive effort	33,800 lb.	49,400 lb.
Weight in working order	219,550 lb.	264,300 lb.
Weight on drivers	143,500 lb.	205,000 lb.
Weight on leading truck	37,400 lb.	20,700 lb.
Weight on trailing truck	38,650 lb.	38,600 lb.
Weight of engine and tender in working order	375,000 lb.	420,000 lb.
Wheel base, driving	13 ft.	15 ft. 9 in.
Wheel base, total	34 ft. 1 in.	34 ft. 4 in.
Wheel base, engine and tender	69 ft. 4 in.	69 ft. 7 in.
Cylinders		
Kind	Simple	Simple
Diameter and stroke	23 in. by 28 in.	25 in. by 30 in.
Valves		
Kind	Piston	Piston
Diameter	13 in.	15 in.
Wheels		
Driving, diameter over tires	69 in.	58 in.
Driving, thickness of tires	7 in.	8 in.
Driving journals, main, diameter and length	10½ in. by 12 in.	10½ in. by 21 in.
Driving journals, others, diameter and length	9½ in. by 12 in.	9½ in. by 12 in.
Engine truck wheels, diameter	36 in.	33 in.
Engine truck journals	5½ in. by 12 in.	5½ in. by 12 in.
Trailing truck wheels, diameter	44 in.	36 in.
Trailing truck journals	8 in. by 14 in.	8 in. by 14 in.
Boiler		
Style	Wagon top	Wagon top
Working pressure	185 lb. per sq. in.	180 lb. per sq. in.
Outside diameter of first ring	66 in.	76 in.
Firebox, length and width	114⅛ in. by 66 in.	114⅜ in. by 84¼ in.
Firebox plates, thickness	Sides, back and crown, ⅜ in.; tube, ½ in.	Sides, back and crown, ⅜ in.; tube, ½ in.
Firebox, water space	Sides and back, 4 in.; front, 5 in.	Sides and back, 4 in.; front, 5 in.
Tubes, number and outside diameter	186—2 in.	241—2 in.
Flues, number and outside diameter	24—5¾ in.	34—5¾ in.
Tubes and flues, length	20 ft. 6 in.	20 ft. 6 in.
Heating surface, tubes and flues	2,678 sq. ft.	3,553 sq. ft.
Heating surface, fire-brick tubes	27 sq. ft.	27 sq. ft.
Heating surface, firebox	186 sq. ft.	224 sq. ft.
Heating surface, total	2,891 sq. ft.	3,801 sq. ft.
Superheater heating surface	592 sq. ft.	840 sq. ft.
Equivalent heating surface*	3,779 sq. ft.	5,061 sq. ft.
Grate area	52.4 sq. ft.	66.6 sq. ft.
Tender		
Tank	Vanderbilt	Vanderbilt
Weight	156,450 lb.	155,700 lb.
Wheels, diameter	36 in.	36 in.
Journals, diameter and length	5½ in. by 10 in.	5½ in. by 10 in.
Water capacity	8,500 gal.	8,500 gal.
Coal capacity	14 tons	14 tons

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.



Nashville, Chattanooga & St. Louis Pacific Type Locomotive

PREMIUMS FOR FREIGHT TRAIN SPEED

On the Cleveland division of the Baltimore & Ohio special credits are awarded to freight train men for making good time. The arrangement applies to both through and local trains. When a crew makes a run between division termini—from Chicago Junction and Cleveland to Holloway, or from Chicago Junction to New Castle—in satisfactory time, all of the members receive credit, and these credits, according to a circular issued by the superintendent, W. C. Lechlider, "will have great influence in clearing up personal records." This arrangement was put in effect at the beginning of the year, and we are informed that for the first three months the results have been found highly satisfactory. The lengths of the runs are 123, 126 and 133 miles. Bulletins were issued after the end of the first month, and at a number of times since, so that the interest in the scheme has been well kept up; and there is hardly a man in the train service on the whole division who has not already been given credit marks for good runs or for making definite suggestions for improvement. A number of men have received enough credit marks to clear their records of certain reprimands.

In through freight train service the number of hours overtime paid for in March was 392, and this was 100 hours less than the number paid for in February. In the overtime statement for March some of the principal items were: Meeting

trains 83 hours; taking and leaving cars 57 hours; engine failure 17 hours; trains ahead 16 hours; accidents 7 hours.

There are at this time in service on the Cleveland division about 40 freight train crews.

In a statement for the months of February and March, showing the degree of promptness with which "quick despatch" trains were moved on different divisions of the Baltimore & Ohio, the Cleveland division stands at the head of the list in both months.

THE WABASH REORGANIZATION PLAN

On April 28 the three committees, two representing the first refunding and extension mortgage bonds and one the stockholders, signed the reorganization plan of the Wabash, which provides for the formation of a new company and the raising of $27,720,000 cash to pay off receivers certificates, expenses of the receivership, and furnish working capital for the new company. Kuhn, Loeb & Company, New York, are to form a syndicate to underwrite this reorganization plan.

Under the plan the underlying $62,302,000 bonds will remain undisturbed, interest having been paid on these bonds by the receivers, and the $2,541,000 equipment obligations maturing after December 31, 1915, will remain undisturbed, as will also the debenture mortgage bonds, of which there is but $315,000 outstanding, not controlled by the joint reorganization committees. This makes a total of $65,158,000 undistributed obligations. The new company will issue $46,200,000 5 per cent profit sharing preferred (non-cumulative) stock A; $48,720,000 5 per cent convertible preferred (non-cumulative) stock B; $43,540,000 common stock, and $1,500,000 4 per cent notes due May 1, 1920. This is a total of $139,960,000 new securities, and a grand total of $205,118,000 to be issued or assumed by the new company. The old company had a capitalization of $198,160,000, exclusive of guarantees, floating debt, etc., and before the issue of receivers' certificates or other obligations of the receivers. The present total capitalization of the old company and the obligations incurred by the receivers, excluding, however, undetermined guarantees, is $222,319,377. The total charges, inclusive of receivers' certificates, are at present $5,795,278. Under the reorganization plan the total interest charges would be $3,183,915.

The various classes of securityholders and creditors affected are as follows, exclusive, of course, of the holders of underlying bonds which remain undisturbed:

First Refunding and Extension Mortgage Bondholders.—There is $40,600,000 of these first refunding and extension mortgage bonds outstanding and there is in addition $5,684,000 coupons in default on these bonds. Holders of these bonds under the new plan are to receive payment in cash for their January 1, 1912, interest coupon ($20 per bond, or a total of $812,000) and 120 per cent of the face value of their bonds in new convertible preferred stock B, the total amount being $48,720,000. The price which they pay for this is the surrender of their old bonds and the agreement which they must enter into to underwrite the raising of the needed $27,720,000 cash in the event that the preferred and common stockholders of the old company do not enter into the plan and pay the assessment as provided in the plan. In the event, therefore, that none of the stockholders submitted to the assessment, the first and refunding mortgage bondholder would have to surrender his bond and pay $682.76 per bond in cash, less $20 which he would receive in cash for the coupon due January 1, 1912, making a net cash payment of $662.76, for which he would receive $1,137.93 in new profit sharing preferred stock A, $1,200 in new convertible preferred stock B, and $1,072.41 in new common stock.

Preferred Stockholders.—There is outstanding $39,200,000 of old preferred stock. This stock under the plan is to pay an assessment of $30 per share in cash and give up the old preferred stock certificate with a par value of $100 and receive in exchange $50 par value of new profit sharing preferred stock A, amounting in all to $19,600,000, and $50 in new common stock, amounting in all to $19,600,000.

Common Stockholders.—There is $53,200,000 common stock outstanding on which an assessment of $30 in cash per $100 share is to be paid by the holders thereof and the stock certificates surrendered, and holders are to receive in exchange $50 per share in new profit sharing preferred A stock, a total of $26,600,000, and $45 per share in new common stock, amounting in all to $23,940,000.

Unsecured Creditors.—Creditors of the company are to receive 25 per cent of their claims in new convertible preferred stock B at par and 75 per cent in new common stock at par (the total amount of stock so issuable is not exactly determinable and is not included in any of the total figures for capitalization given above or below).

In the event that the stockholders do not submit to an assessment of $30 per share their equity is apparently wiped out and the burden of reorganization falls on the present holders of the first refunding and extension mortgage bonds. In the event that a part or all of these bondholders do not accept this burden, the only equity which they will have is their pro rata share of the difference between the price which the sale of the property subject to the underlying bonds will bring under foreclosure sale and the sum necessary to pay off the receivers' certificates. The upset price of the property subject to the underlying bonds has been fixed at $21,000,000 by the court and there are $15,950,000 receivers' certificates outstanding beside a judgment for $950,377, known as the Compton judgment. The fact that a syndicate headed by Kuhn, Loeb & Company is to underwrite this plan means that if the stockholders do not pay their assessment, and a part or all of the necessary cash is not raised by the first and extension mortgage bondholders, the underwriting syndicate will raise the cash, paying to dissenting bondholders their proportion of the residue after the sale as mentioned above, and will take the securities which would have been distributed to stockholders and bondholders under the plan had they paid their asessments.

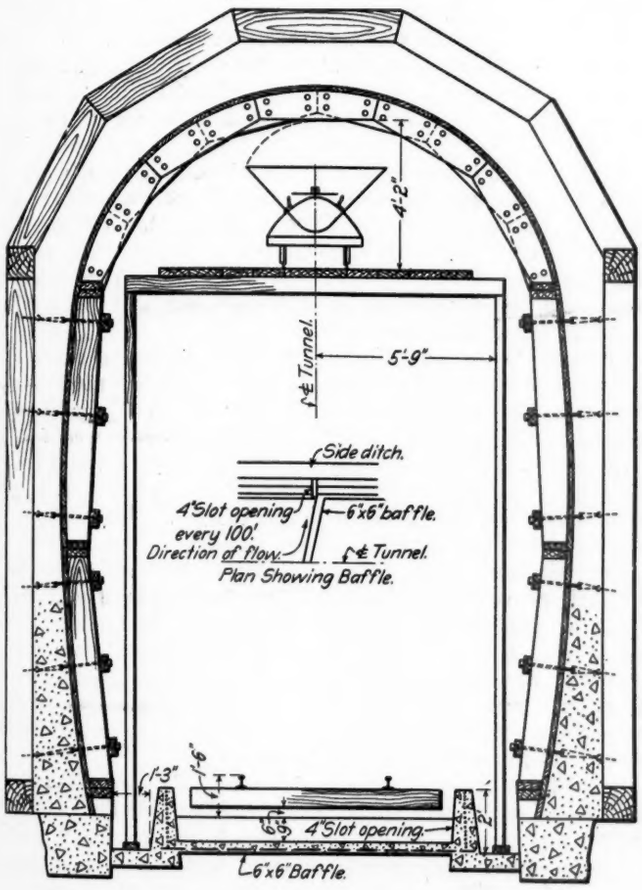
LINING TUNNELS ON THE NEW LEWISTOWN-GREAT FALLS LINE OF THE ST. PAUL

On the extension of the Chicago, Milwaukee & St. Paul from Lewistown, Mont., to Great Falls, described in the *Railway Age Gazette* of April 2, 1915, there are six tunnels aggregating 5,333 ft. in length, all of which are lined with reinforced concrete, except one 250 ft. long. The linings have a minimum overhead thickness of 15 in., and a sidewall thickness of 12 in. The accompanying drawing shows a typical cross section of the lining and the special concrete gutters which were provided to care for the drainage in tunnel No. 1. Tunnels No. 3, 4, 5 and 6 required no special provision for drainage. Wooden forms lined with sheet metal and built in sections 16 ft. long were used. These were wedged up to position at the bottom and after the concrete was poured and set the wedges were removed and rollers substituted to enable the form to be moved to a new position. Each form was allowed to remain in position for 48 hours after the concrete was poured before being moved.

At tunnel No. 1 the concrete plant consisted of three mixers, one being set in front of and above each portal on falsework and one at a shaft, 118 ft. deep, 750 ft. from the west end of the tunnel. The shaft was sunk by the forces which drove the tunnel and was finally lined with concrete for ventilating purposes. Gravel and cement were delivered at the tops of the banks adjacent to the mixers at the portals by wagons and were delivered from these points to the mixers by gravity chutes as required. The mixers discharged the concrete directly into steel dump cars which were operated on a double track placed on a staging. This staging was built as high as possible to permit the operation of trains through the tunnel. The dump cars delivered the concrete to a point opposite the form to be poured and discharged it di-

rectly into that portion of the form below the springing line. For that portion above this the concrete was poured into a shallow box from which it was shoveled into the form. The lagging above the springing line was made in sections about 3 ft. wide, so that it could be removed from the form centers to enable the arched portion of the lining to be placed more readily. The concrete mixer at the shaft discharged into small cars which were lowered in a cage down the shaft to the staging where the concrete was dumped into the delivery cars.

To make sure that all voids adjacent to the segmental timbers were filled it was decided to force cement grout back of the concrete lining. To accomplish this, a plant consisting of a Ransome-Caniff grout mixer, a 40-hp. kerosene burning engine and a 10 in. by 10 in. single-stage air compressor was installed. The grout mixer was mounted on a small push car or set to one side of the track on the ground in the tunnel, as circumstances



Cross Section of Tunnel 1 Showing Side Drains and Method of Placing Concrete Lining

required, and from this the grout was conducted through a 2 in. air hose to 2 in. pipes previously placed in the crown of the arch. The pipes left in the crown of the arch to receive the grout were spaced about 5 ft. center to center and grout was forced into one pipe until it made its appearance at the next pipe but one when the connection of the air hose was made to the next pipe. The air pressure used was 60 lb. to 100 lb., according to the conditions. The plant was operated with five men and an engineer who succeeded in placing 280 batches of 2⅔ cu. ft. of grout each in 10 hours. An average of 230 batches per 10 hours was maintained throughout the five tunnels.

The same general scheme was used for lining all of the other tunnels with some minor differences due to local conditions. Tunnel No. 4, which was affected by an adjacent slide, required retimbering for a distance of 200 ft. at the east end, and to provide against the heavy lateral movement, induced by the slide, the wall timbers when reset were so placed as to provide an additional thickness of concrete of 18 in. In addition to this excavations were made between the wall timbers into which concrete was poured to form stiffener ribs. It was necessary at this tunnel to elevate the gravel for concrete 250 ft., which was accomplished with an inclined industrial track operated by a cable and hoisting engine. The concrete mixing plant at tunnel No. 4 consisted of one mixer mounted at each portal and the mixing of concrete for tunnels No. 3, 5 and 6 was handled with a single mixer at each.

In all of the tunnels excepting tunnel No. 4, which ran 8 cu. yd., the lining averaged 5 cu. yd. per foot of tunnel. At tunnel No. 1, where two 10-hr. shifts were used and three concrete mixers were in operation, as high as 58 ft. of lining was placed in 24 hours, and this rate of progress continued for three weeks toward the end of the work. At the other tunnels, excepting No. 4, 16 ft. of lining was completed every 10 hours with a single shift, and when two shifts were used that rate continued. The average cost of the concrete lining was about $16 per cu. yd.

This work was done by company forces under the general direction of C. F. Loweth, chief engineer, and E. O. Reeder, assistant chief engineer. F. B. Walker was assistant engineer in direct charge of the work.

COST OF TRAIN LIMIT LEGISLATION

A. J. Earling, president of the Chicago, Milwaukee & St. Paul, in a statement at the hearing before the committee on public utilities of the Illinois House of Representatives recently, in reference to proposed train limit legislation, presented a detailed estimate showing that a law limiting the number of cars hauled in one train to 50 would render valueless investments totaling $4,091,753.32, which have been made by his company on its 415 miles of line in the state of Illinois and would involve an increase in freight train miles in the state of 20.08 per cent., equivalent to an additional operating annual cost of $441,155.04. The investments consist of three items: expenditures made for improvements in the line to permit the hauling of heavier trains, the excess cost of locomotives having greater hauling capacity, and the increased cost of freight cars designed to be handled in longer trains.

For the purpose of this estimate the improvements in line only on the Chicago & Council Bluffs division were considered. These improvements are of five kinds: (1) increase in standards of track construction, (2) extensions of yard and passing tracks, (3) strengthening of permanent bridges, (4) increase in size of turntables, engine houses and other facilities, and (5) reduction in grades. Under the first head it was assumed that to haul the present business with lighter engines the same track mileage would be needed, but that the standards could be placed on a basis of 75-lb. rails, lighter fastenings, less ballast and fewer ties. The difference between the cost of the present track structure and the lighter track amounts to $589,950 for the 146 miles of double-track line considered. The estimated cost of yard and side tracks in excess of the lengths required for 50-car trains amounts to $1,056,200. In estimating the value of these extensions the cost of the necessary grading, track structure and right of way was included.

Under present operating conditions all structures are designed for Cooper's E-50 loading. If lighter locomotives hauling 50-car trains were in service, these bridges could be designed to carry not greater than Cooper's E-36 loading. As the ratio of the steel in structures for an E-36 loading and for an E-50 loading is about 0.8, the estimated excess investment is based on 0.2 of the cost of the steel work now in place and 25 per cent of the cost of the substructures, which could be smaller and lighter if they carried lighter structures. The reproduction cost of the present Mississippi river bridge at Savannah is estimated at $331,000 and as the original structure, built in 1880 for a lighter loading, cost approximately $225,000, one-half of the difference, or $53,000, is considered chargeable to the C. & C. B. division in

Illinois, and is included in the estimate of the excess cost of heavy bridges which totals $342,600.

It was assumed that on account of the large equipment now operated, the size of water stations, clinker pits and coaling stations has been increased 25 per cent as compared with the initial construction. The original light equipment required a 56-ft. turntable while at present a 90-ft. one is being used, while during the same time the depth of engine houses has been increased from 70 ft. to 96 ft. It was assumed in making the estimates that the ratio of cost of the engine houses is directly proportional to the length of the stall, the increase amounting therefore to about 30 per cent. In addition to this the present locomotives require more expensive facilities than the earlier light engines, it being assumed that 10 per cent of the cost of these facilities represents the additional investment. The total estimate for the item of buildings is $207,600.

It is a difficult matter to determine the exact investment for grade reductions and changes of line, largely on account of the early cost-keeping methods. The total figure used, $546,150, was obtained from an early estimate by the chief engineer, with allowances for other grade reductions made in changes of line, an estimate of the cost of certain items such as freight on material paid to foreign companies, transportation of men over company lines, engineering and legal expenses, etc., and the expenditures made by the operating department to raise sags, widen banks and cuts.

The excess cost of the locomotives which have been purchased to handle heavier trains, assignable to the state of Illinois on the basis of locomotive mileage, is estimated at $742,011.32. This figure was secured by determining the average cost of all engines purchased between July 1, 1899, and June 30, 1907, and a similar figure for the engines purchased between July 1, 1907, and June 30, 1914. The difference between these figures, amounting to $4,463.32 is taken as the excess paid for each locomotive during the latter period to secure greater power. This rate applied to the number of engines purchased during that time gives the total excess investment for the system, from which the portion chargeable to Illinois is secured.

In order to arrive at the cost of properly equipping freight cars to be handled in long trains, a detailed statement was prepared showing the cost of all freight equipment cars, including cabooses, that have been built with metal draft arms, with steel center sills, and with steel underframes, also cars equipped with friction draft gears, and for each car an estimate was made of the investment which would have been necessary if the car had not been equipped with these improvements. The difference between these figures applied to the total number of cars showed an excess investment of $5,043,541 for the system, of which $607,242 is chargeable to Illinois on the basis of freight car mileage in that state.

The estimated cost of operating additional trains if a 50-car limit bill was passed, was prepared as follows: It was assumed that all cars exceeding 50 in trains operated on the present basis would have to be made up into new trains moving between the same two points daily, except that for each particular run not to exceed 10 cars daily could be absorbed in trains now operating with less than 50 cars or could be held over for the same run the following day. In other words, it was assumed that all of the traffic moving on a particular day would have to move on that same day if this bill was passed. If, for example, four trains running between Chicago and Savannah handled 63 cars each on a certain day, there would, under the new system, necessarily be five trains each with 50 cars, the two additional cars being held over until the following day. If, however, there were four trains run that day between Chicago and Savannah, each with 68 cars, it was assumed that it would be necessary under the proposed law to run six trains that day, five with 50 cars and one with 22 cars. The estimates were prepared on two assumptions; first, that all trains would run between their present destinations with 50 cars and the other that they would be stopped at the state line and there made up into trains of the maximum length which can be hauled on the division. Under these assumptions, it was shown that 416,184 and 292,815 additional train miles, respectively, would be required. On the basis of $1.06 for each additional train mile this would involve an annual additional operating cost of $441,155.04, or $310,383.90, respectively. The first figure representing increase in train mileage is 20.08 per cent of the total train mileage in the state at present.

THE GOLDEN RULE APPLIED TO FREIGHT CLASSIFICATION

The following is taken from The Houghton Line, a trade publication of E. F. Houghton & Co., Philadelphia:

I remember once our sales department came to me and asked me to represent them before the Southern Freight Classification Committee, in a protest against what our folks considered was an unjust classification. I asked for the facts and arguments. They gave them to me. I read them over, and I said: "I don't see any argument in here which would influence me if I were a railroad man."

A railroad man is working for the railroad. It is the railroad's duty to serve the public, but it is every railroad man's duty to remember that the public are also his stockholders. I asked them what argument I could give the railroad that would be worth while from the railroad man's idea. They could furnish me with no such argument, and I refused to appear before the committee.

The next year, when the Classification Committee again met at Atlantic City, our folks came to me with what they supposed was a terrible grievance. We had lost all of our trade because of the unjust classification, and the people who formerly bought from us were buying tallow locally; not that the tallow was better, but it was so much cheaper when you took into consideration the excessive freight charges. And I said to them: "Here is an argument for the railroad.

"The railroad has lost business. They collect no freight on the local tallow at all. They are mutually interested with us in a lower classification. They can benefit their stockholders by such a classification." And forthwith I appeared before the committee at Atlantic City, and the committee being composed of railroad men—good railroad men—wise railroad men—saw the point at once. They didn't detain me 10 minutes, and the request was granted.

But while I was only 10 minutes doing my little turn before the committee, I sat in that committee room pretty nearly three hours waiting for my case to be called, and I was impressed and amazed at the general attitude of every man who had a case before the committee. Each one was protesting against an individual injustice to himself. He wanted the railroad to do something which would enable him as an individual to beat out his competitors, which would be to his personal individual advantage, just as if the railroads existed for the personal advantage of any individual concern. Not one single argument did I hear which presented to these railroad men some advantages for the railroad. It is as if a man would come to you and want to buy goods on which he knew you were going to lose money, merely that he might make more for himself.

And that is the general attitude of the public towards public service corporations in general and railroads in particular.

WOMEN AS RAILWAY PORTERS IN ENGLAND.—The Great Central Railway of England is making experiments to see how far women can be employed as railway porters to set free men of military age. At present two women are being employed at Marylebone in this capacity. The experiment is the result of suggestions from the railway executive committee, and it is expected that other railways will follow the Great Central's example.

General News Department

In Pennsylvania the bill before the legislature to repeal the "full crew law" has been passed by the lower House, and in the Senate has been reported out by the committee, by a vote of seven to six.

The United States civil service commission will receive applications until June 8 for the position of examiner of accounts for the division of valuation of the Interstate Commerce Commission; salary from $2,220 to $3,000 yearly.

A press despatch from Seward, Alaska, reports that on Thursday, April 29, the first spike on the new government railroad was driven by Martha White, who was the first white child born in that region. The engineering commission in charge of the construction of the railroad has issued notices discouraging men looking for work; but very few are to be employed this season.

The new freight terminal of the St. Louis Southwestern, situated at the foot of East Fifth street, Fort Worth, Tex., was opened on May 1. The office building is two stories high and 40 ft. square, and is built of reinforced concrete and brick. The freight warehouse is 420 ft. long, has three scales, has creosoted plank flooring and 27 receiving and delivering doors. The entire building is under tile roofing.

Dr. F. H. Newell, consulting engineer of the United States Reclamation Service, has been appointed professor of civil engineering at the University of Illinois, effective May 1, succeeding Prof. Ira O. Baker, who has resigned after 40 years of service. Prof. Baker tendered his resignation over a year ago, but has held the position pending the selection of a successor. He will probably continue to be connected with the department.

Special Train to Atlantic City Mechanical Conventions

The Pennsylvania Lines have announced that for the accommodation of those who will attend the conventions of the Master Mechanics' and Master Car Builders' Associations at Atlantic City next month, a special train will be provided, leaving Chicago at 5:30 p. m. on Monday, June 7, and arriving at Atlantic City about 5 p. m. the following day. The summer tourist fare will be $31.15 for the round trip, tickets good to return within 30 days, with an extra fare of $4.

Air Brake Law More Rigid

In the United States Circuit Court of Appeals at Richmond, Va., May 4, the judges affirmed unanimously a decision of the District Court, holding it unlawful for a railroad to require the use of hand brakes to control the speed of trains while on the road; that is to say, presumably, at all places where the law requires the train to be equipped with air brakes in condition for use. The contention of the road was that, with long trains on descending grades, the use of the hand brakes, to supplement the air brakes, was necessary to safety. The court held, in substance, that excepting in extraordinary emergency the use of the hand brakes in such a situation is contrary to the air-brake law.

National Transcontinental Road to Be Opened

The Canadian Government announces that in consequence of the declination of the Grand Trunk Pacific Railway to take a lease of the new government railroad, the government itself will at once proceed to put the line in operation from Moncton, N. B., to Winnipeg, Man. At the same time the government will take over and operate the Lake Superior division of the Grand Trunk Pacific, which is the branch of the National extending to Fort William. The officers of the government railway system, now operating the Intercolonial, will take charge of the operations on the new line. Between Winnipeg and Fort William, where the Grand Trunk Pacific has been running trains for some months, the employees will be taken into the government service. It appears that trains have been run, by or in behalf of the contractors on about 300 miles of the line east and west of Cochrane. Cochrane is at the junction of the Temiskaming & Northern Ontario, about 500 miles north of Toronto. The government has for several months been running trains three times a week on the National between Moncton and Levis, opposite Quebec, about 466 miles.

Railroad Laws in New Jersey

In New Jersey, as in New York, the interests opposed to the repeal of the excess crew law succeeded in preventing repeal. Mr. Stevens, of Cape May, had introduced two bills, one to repeal the law now on the statute books, and the other to specifically give authority to the public utility commissioners to decide as to the number of men required on trains; but neither bill ever came up for discussion.

Other railroad legislation played but a small part in the sessions of the legislature. There are six new statutes bearing on railroad interests, but none of them is of great importance.

Governor Fielder vetoed the Pierce grade crossing bill, which passed both houses, a comprehensive law being already on the statute books. This existing law leaves the elimination of grade crossings entirely in the hands of the Board of Public Utility Commissioners. The Pierce bill proposed the elimination of one crossing annually for each thirty miles of railroad. No attempt was made in the Senate to pass the Pierce bill over the veto.

The new laws this year are:

Chapter 350, authorizing first class cities to operate connecting railroads.

Chapter 402, providing for a penalty of $1,000 for railroads refusing to honor passes held by State officers.

Chapter 401 allows a new railroad to take over a line already in existence.

Chapter 57 defines the powers of railroads and municipalities in the adjustment of costs for grade crossing changes.

Chapter 408 gives free passes to members of new boards created this year.

Chapter 404 regulates the construction of physical connections between railroads, the Utilities Commission being clothed with power to require the establishment of connections.

Opening of the Van Buren Bridge

The new bridge of the Van Buren Bridge Company across the St. John river, connecting the Bangor & Aroostook Railroad in Maine with the International Railway in New Brunswick, was opened on May 1 in the presence of a large number of visitors, including officers of New England and Canadian railroads and members of the American Congress and the Canadian Parliament. This bridge, a riveted lattice, consisting of five spans, each 160 ft. long, was begun only last September, and a large part of the work has been done while the temperature was around zero, and at times much lower. To build the concrete piers under these conditions, housings were used around each pier, and by using steam pipes and salamanders, the concrete was successfully made in spite of the low temperatures. The cantilever method of erection was used, thus avoiding risk of interruption of the work by the breaking up of the ice in the river.

The president of the Van Buren Bridge Company is P. R. Todd, president of the Bangor & Aroostook Railroad; consulting engineer, W. J. Wilgus, of New York City; resident engineer, T. A. Lang. The railroad of the Van Buren Bridge Company is 1.2 miles long, Van Buren, Me., to St. Leonards, N. B. On the Canadian side it crosses the National Transcontinental and a branch of the Canadian Pacific, a single interlocking plant (electric) serving for both of these crossings.

By the opening of this route the all-rail distance from a large part of New Brunswick and Quebec to Southern New England is shortened about 200 miles.

The contractors for the substructure were: Cyr Brothers, of

Waterville, Maine, and for the bridge, the Dominion Bridge Company, Limited, of Montreal. Hill & Hammond, of Woodstock, N. B., were contractors for the roadbed, track-laying, ballasting, fencing, and telephone line, and the General Railway Signal Company of Canada, Limited, of Montreal, for the interlocking plant.

Industrial Relations Commission at Washington

The Federal Industrial Relations Commission resumed hearings in Washington, D. C., on May 4. The inquiry opened with H. B. Perham, president of the Order of Railway Telegraphers, as the first witness, who declared that the Pennsylvania Railroad oppressed its employees. He was followed by Robert T. Lincoln, chairman of the board of directors of the Pullman Company, who was questioned regarding conditions of employment of porters and conductors.

Mr. Perham said that the only organizations of employees recognized by the Pennsylvania were those of the engineers, firemen, conductors and brakemen.

"It has discriminated," he said, "against the railroad telegraphers who belong to the organization by discharging them, and denying them promotion. It has pursued the same tactics against the organized shopmen and broke up the organization of the clerks by discharging all those who would not withdraw from the unions."

Foremen and minor officials had bluntly informed men that they were discharged "because of their labor activity," though there was some technical charge assigned for their dismissal.

The road's police system, he said, cost about $800,000 a year. He gave instances of alleged espionage and arrests of union men, and charged that the strike in May, 1911, was precipitated when officers of the company sought to compel 1,000 employees to withdraw from labor unions. He said that the Voluntary Relief Association of the railroad company was not voluntary. Employees, in joining, signed an agreement to forfeit all their accumulation of premiums if they went out of the service of the company. Last year, he said, 4,141 employees, who had thus paid $3,707,080, left the employ of the company and lost all they had paid in.

Mr. Lincoln's testimony in large measure covered the same ground as that covered in the hearings at Chicago and reported in the *Railway Age Gazette* April 9, page 786. Asked if he thought the salary of $27.50 now paid a negro porter as a minimum is enough to maintain his family in comfort and decency, he replied, "Absolutely not." The Pullman Company, he said, was not opposed to organized labor, provided it permitted the company to engage men outside the union. The way for men to negotiate with employers about wages or working conditions, in his opinion, was to appoint committees to interview officers. Asked if he thought paying porters $60 a month and posting notices in all cars requesting that tipping be abolished would have any effect, Mr. Lincoln said he thought tipping would continue.

Mr. Lincoln said that the Pullman Company employed from 6,000 to 6,500 porters. There were 45 district superintendents, and these places were filled from the ranks of the conductors.

The chairman of the commission asked Mr. Lincoln if it were true that the employees had made complaints of their condition and treatment and that their petitions never reached the board of directors. Mr. Lincoln said he thought "it would be rather hard to get the board together for such a purpose."

Mr. Lincoln said that the custom of paying tips was not a nice one. "But it is an old custom and one to which the colored race is accustomed. The public seems to be fond of it. The little services a porter can do seem to justify the tip."

"Do you know that there is a widespread criticism of your company on account of it?" asked Mr. Walsh.

"No, I never heard of such a suggestion," replied Mr. Lincoln.

Asked about losses of linen and the system of penalties to restrain this loss, Mr. Lincoln said that two-thirds of the whole number of employees of the company were paid the good service bonus last year, so that not many could have been punished for loss of linen. The fines for linen lost amounted to $60,000 last year, but the actual losses were far greater than that. Men were not fined a month's salary for their delinquencies and no men had been discharged, as had been reported, for trying to organize unions.

Mr. Lincoln described the relief association maintained by the employees, and said that the Pullman Company underwrote the mutual assessment plan of death payments. The company had no direct plan for relief of employees in sickness or in case of accident.

Solicitor Daniels of the Pullman Company testified concerning legal matters. Where a Pullman employee was hurt in a railroad accident, a suit at law against the operating company was the regular course pursued. He told of a Pullman employee who got a judgment against the Pennsylvania Railroad recently for $14,000 for injury in an accident.

"And we had to pay the judgment," added Mr. Daniels. The Pullman Company is forced by many of its contracts to settle all such judgments for injury by accidents. "The strongs roads," said Mr. Daniels, "compel us to do this and the weak ones can't."

On Wednesday, W. W. Atterbury, vice-president of the Pennsylvania Railroad, testified at length. He presented a prepared statement which explained the policy of the road and rehearsed at length the dealings of the company with the telegraphers' brotherhood and with the federal mediation board in 1909 and 1912; he replied in detail to charges of unfairness to organized labor. He said that the company did not oppose organization of its employees, but did insist upon the "open shop" principle and opposed unions with affiliations which might bring on sympathetic strikes

"We would welcome closer relations with our employees," said Mr Atterbury, "if it could be brought about under proper auspices. We would more than welcome an organization of all Pennsylvania Railroad employees among themselves without entangling outside alliances. Such an organization undoubtedly would be good for the railroad, and anything that is good for the railroad is good for the employees. Our position is identical with that of the federal government respecting the postal railway employees. The government forbids these employees joining an organization that might call them out of their work through sympathy."

"Is the question asked whether a man is a member of a union?"

"No. We never ask the question in employing a man unless he begins to bother us. We are acting on the defensive and not the offensive."

"Is the relation between labor and the employer getting better?"

"I should say so. In the last ten years there has developed a new code. It is different from that of twenty years ago. In the Pennsylvania Railroad all of us come up from the ranks. We are one big family, and we try to avoid outside interference with our affairs. I should be very much surprised if we ever see a great railroad strike again. Industrial conditions are getting better. Labor and employer are closer in touch."

Mr. Atterbury said he was not opposed to many features of the Canadian arbitration law which requires the giving of 30 days' notice before a strike can be declared, and allows the government to present both sides of the dispute.

Concerning the manner in which the railroad kept in touch with sentiment among its men, Mr. Atterbury said:

"Confidential investigators, in no way connected with the railroad's police department, are employed to ascertain and report the conduct and sentiment of employees and the movements, actions and plans of labor leaders and organizers. These men are not empowered to make arrests.

"Labor leaders, with control of the workmen through membership in labor organizations, can cause employees to leave their work, resulting in a strike and interfering with train operations, without giving any previous warning. As the railroad company has the responsibility of maintaining adequate train service and is subject to fines by the government for delays to the mails, it must keep itself informed of the movements of labor agitators. It is necessary that trained men be employed to conduct these investigations.

"Confidential investigators are also employed to identify themselves as employees in various departments to secure correct information as to any efforts of labor organizers among employees which tend to destroy the harmony and friendly feeling which for many years have generally existed between this company and its employees. Investigators are also employed to learn the grievances, if any, of the employees which have been reported to labor organizations for adjustment, in order that such satisfactory settlement as conditions will permit may be made, and to keep the officers fully informed of conditions which they

should know, to permit them properly to manage the property. . . .

"We know what is going on. There are volunteers who give us information. There are about 400 in the police department, and we are prepared for anything that might happen. We do not leave anything undone to keep our trains running that is legal and lawful."

In answering the question whether it was possible for the state to give police protection Mr. Atterbury said:

"In theory, yes, but in practice, no. There is so much opposition to the state protecting corporations that we have found it necessary to look after protection for ourselves.

"We have the finest body of men in the United States in Pennsylvania, the state constabulary. Yet every labor organization is bitterly opposed to its enlargement. It is a dream of the millennium to expect police protection from the states, with all the different political winds blowing through the legislature. If the states should properly protect us it would be an ideal situation. We ought not to attend to the police duty of the states, but we are forced to do it."

American Society for Testing Materials

The eighteenth annual meeting of the American Society for Testing Materials will be held at the Hotel Traymore, Atlantic City, N. J., June 22 to 26.

At the first session meeting, on Tuesday, June 22, at 11 a. m., opening business will be conducted and reports will be received from the committees on Standard Specifications for Coal, and on Standard Specifications for Coke.

At the second session, on Tuesday, at 3 p. m., reports will be received from the committees on Standard Specifications for Wrought Iron; Standard Specifications for Cast Iron and Finished Castings; Corrosion of Iron and Steel, and Standard Tests of Insulating Materials.

The subjects assigned for the remaining sessions are as follows:

Third, Tuesday, June 22, 8 p. m., Non-Ferrous Metals.

Fourth, Wednesday, June 23, 10 a. m., Steel.

Fifth, Wednesday, June 23, 8 p. m., Heat Treatment of Steel.

Sixth, Thursday, June 24, 10 a. m., Testing Apparatus. Among the four papers to be presented at this session will be one by C. D. Young, engineer of tests, of the Pennsylvania Railroad, entitled: The New Physical and Chemical Laboratory of the Pennsylvania Railroad at Altoona.

Seventh, Thursday, June 24, 3 p. m., Cement and Concrete.

Eighth, Friday, June 25, 10 a. m., Ceramics, Gypsum and Lime.

Ninth, Friday, June 25, 3 p. m., Preservative Coatings and Lubricants.

Tenth, Saturday, June 26, 10 a. m., Road Materials, Timber and Rubber.

Recreation periods are provided for Wednesday afternoon and Friday evening, and a smoker is announced for Thursday evening. Special rates have been secured in the hotel for the members of the society and their guests. In addition to the reports of the standing committees and the presentation of monographs on the special subjects, the convention will consider four proposed amendments to the by-laws affecting membership and the adoption of standards.

Air Brake Convention

The twenty-second annual convention of the Air Brake Association was held at the Hotel Sherman, Chicago, May 4 to 7, L. H. Albers, New York Central Lines, presiding. The convention was opened with prayer by Rev. Martin J. Magor. Robert Quayle, general superintendent of motive power and car department, Chicago & North Western, welcomed the association to the city with an inspiring address, calling particular attention to the opportunities of the air brake men in assisting their respective roads in performing their service to the public. He complimented the association on the work it has done to improve conditions in train operation and clearly pointed out the importance of the work of the air brake expert.

President Albers in his address laid particular stress on the standardization of air brake equipment and economical practices in the operation and maintenance of the air brake, believing that if more care was exerted in the cleaning of triple valves, more time could be given between the periodic cleaning which would show a substantial saving.

During the opening exercises W. J. Hatch, the retiring president, was presented with the past president's badge, and S. J. Kidder was given a loving cup as a token of the honor and esteem in which he was held by the association. A letter was also read to the association from F. W. Brazier, superintendent of rolling stock, New York Central Lines, who was invited to address the association, but was unable to be present.

The secretary reported a total membership of 1,119 members and a cash balance in the treasury of $427.91, as of May 1, 1915. A complete report of the convention will be published in next week's issue.

The following is a list of exhibitors at the convention:

American Steel Foundries, Chicago.—Brake beams. Represented by W. E. Fowler, Jr., and P. O. Johnson.

Ashton Valve Company, The, Boston, Mass.—Gages, testers, wheel press recorders and valves. Represented by J. W. Motherwell, H. O. Fettinger and J. F. Gettrust.

Barco Brass & Joint Company, Chicago.—Barco flexible joints, metallic car connections. Represented by F. N. Bard, C. L. Mellor and L. W. Millar.

Crane Company, Chicago.—Air brake fittings. Represented by Frank D. Finn, F. W. Venton and John Jordan.

Detroit Lubricator Company, Detroit, Mich.—Lubricators. Represented by A. D. Homard and A. G. Machesney.

Dixon Crucible Company, Joseph, Jersey City, N. J.—Flake graphite. Represented by Mr. Snyder.

Garlock Packing Company, Palmyra, N. Y.—Fiber packing. Represented by T. P. Dunham and J. P. Landreth.

Green, Tweed & Co., New York.—"Palmetto" packing. Represented by F. M. Thomson and V. B. Nickerson.

Johns-Manville Company, H. W., New York.—Packing expander rings and slack adjuster. Represented by J. E. Meek, G. Christenson and P. C. Jacobs.

N. Y. & N. J. Lubricant Company, New York.—Non-fluid oil, brake cylinder lubricant, N. F. O. triple valve lubricant. Represented by J. H. Bennis and F. E. Sparks.

American Railway Association

General Secretary W. F. Allen announces that the spring meeting of the American Railway Association will be held at The Biltmore, Madison and Vanderbilt avenues, Forty-third and Forty-fourth streets, New York City, on Wednesday, May 19, beginning at 11 a. m. Reports will be presented by the committees on transportation, on maintenance, on relations between railroads, on the safe transportation of explosives and other dangerous articles, on electrical working and on legal and traffic relations. The election of a second vice-president will take place at this meeting, and also of members of several committees.

American Association of Railway Surgeons

At the annual meeting of the American Association of Railway Surgeons held in Chicago on Monday, Dr. J. P. Kasper, chief surgeon of the Atchison, Topeka & Santa Fe at Topeka, Kan., was elected president; Dr. J. M. Burke, of Petersburg, Va., was elected vice-president, and Dr. L. J. Mitchell, of Chicago, was re-elected secretary and treasurer.

Association of American Railway Accounting Officers

R. A. White, general auditor of the New York Central Railroad, has been elected president of the Association of American Railway Accounting Officers, and L. A. Robinson, comptroller of the Chicago & North Western, first vice-president; J. A. Taylor, comptroller of the Central of New Jersey, second vice-president, and E. R. Woodson, secretary, have been re-elected.

Central Railway Club

At the regular meeting of the Central Railway Club to be held at the Statler Hotel, Buffalo, N. Y., on Friday, May 14, S. S. Riegel, mechanical engineer of the Delaware, Lackawanna & Western, will present a paper entitled: The Locomotive of Recent Developments.

New England Railroad Club

At the regular meeting of the New England Railroad Club to be held at the New American House, Boston, Mass., on Tuesday, May 11, Henry Cave, president of the Cave Welding Company, will present a paper on Recent Developments in the Oxy-Acetylene Process, which will be illustrated with stereopticon views.

The American Society of Mechanical Engineers

At the meeting of the American Society of Mechanical Engineers to be held at the Engineering Societies building in New York, on Tuesday, May 11, a paper will be presented by John Calder, entitled Metal Spray Processes in Engineering and art.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, 455 Grand Central Station, Chicago. Next meeting, July 21, 1915, Milwaukee, Wis.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next meeting, October 21-23, 1915, Boston, Mass.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 18-21, 1915, Richmond, Va.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next meeting, August 19-20, 1915, San Francisco, Cal.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 4-8, 1915, San Francisco, Cal.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. G. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

AMERICAN RAILROAD MASTER TINNERS, COPPERSMITHS AND PIPEFITTERS' ASSOCIATION.—W. E. Jones, C. & N. W., 3814 Fulton St., Chicago. Annual meeting, July 13-16, 1915, Hotel Sherman, Chicago.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Next session, May 19, 1915, New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 19-21, 1915, Detroit, Mich.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 21-23, 1916, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 9-11, 1915, Atlantic City, N. J.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—Owen D. Kinsey, Illinois Central, Chicago. Annual meeting, July 19-21, 1915, Hotel Sherman, Chicago.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa. Annual meeting, June 22-26, 1915, Hotel Traymore, Atlantic City, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York, Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Next spring meeting, June 22-25, 1915, Buffalo, N. Y. Annual meeting, December 7-10, 1915, New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, Supt. Timber Preservation, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 18-20, 1916, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, 2d Tuesday in October, 1915, New York.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Semi-annual meeting with Master Car Builders' and Master Mechanics' Associations. Annual meeting, October, 1915.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, 1915, Rochester, N. Y.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Next meeting, June 22-23, Niagara Falls, N. Y.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Traffic Manager, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Hotel La Salle, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1126 W. Broadway, Winona, Minn. Next convention, July 13-16, 1915, Sherman House, Chicago.

INTERNATIONAL RALROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, C. H. & D., Lima, Ohio. Annual meeting, August 17, 1915, Philadelphia, Pa.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next meeting, October 19-21, 1915, St. Louis, Mo.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May 25 to 28, 1915, Hotel Sherman, Chicago, Ill.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 14-16, 1915, Detroit, Mich.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 14-16, 1915, Atlantic City, N. J.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March, 1916, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.

PEORIA ASSOCIATION OF RAILROAD OFFICES.—M. W. Rotchford, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.

RAILROAD MEN'S IMPROVEMENT SOCIETY.—J. B. Curran, Erie R. R., 50 Church St., New York. Meetings, alternate Thursdays, October to May. Assembly Rooms of Trunk Line Association, 143 Liberty St., New York.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December, 1915, Waldorf-Astoria Hotel, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1063 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Next meeting, October 5-7, 1915, Chicago.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Stated meeting, May 26-27, 1915, Hotel Astor, New York. Annual meeting, September 14-17, 1915, Salt Lake City, Utah.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, N. Y. C. R. R., Box C, Collinwood, Ohio. Annual meeting, May 17-19, 1915, Hotel Sherman, Chicago.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders and Master Mechanics' Associations.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Annual meeting, September 14-16, 1915. Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, David Keith Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, C. R. I. & P., 1134 La Salle St. Sta., Chicago. Annual meeting, September, 1915.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga. Next meeting, July 15, 1915, Atlanta. Annual meeting, January, 1916.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Piedmont Hotel, Atlanta.

TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEWARK.—John J. Kautzmann, P. O. Box 238, Newark, N. J. Regular meetings, 1st Monday in month, except July and August, The Washington, 559 Broad St., Newark.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings last Tuesday in month, except June, July and August, Hotel Astor, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Genl. Agt., Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings bi-monthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldgs., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DISPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, N. Y. C. R. R., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., East Buffalo, N. Y. Annual meeting, September 7-10, 1915, Chicago.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings. Annual meeting, 1st Wednesday after 1st Thursday in January, Chicago.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY, 1915

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Kansas City, Mexico & Orient	740	$169,176	$27,000	$206,236	$38,472	$36,316	$8,488	$82,722	.....	$9,925	$175,923	$30,313	$8,961	$21,348	.....
Oahu Railway & Land Co.	109	71,289	19,086	96,664	8,085	9,099	682	21,562	.....	3,964	43,391	53,273	7,334	45,939	$9,347
Pittsburgh, Shawmut & Northern	294	132,028	8,612	142,141	13,420	36,801	2,419	48,917	.....	4,262	105,818	36,323	1,597	34,726	—15,810

MONTH OF MARCH, 1915

Alabama & Vicksburg	143	$83,204	$26,579	$120,122	$18,105	$30,617	$3,690	$47,243	$1,882	$5,529	$107,247	$12,875	$8,600	$4,275	$5,176
Alabama Great Southern	309	293,982	72,791	398,463	45,669	81,680	12,475	154,757	2,589	10,451	301,350	97,114	15,172	81,915	18,393
Ann Arbor	294	129,541	37,565	179,353	13,273	27,408	5,784	75,481	268	7,186	129,399	49,954	10,580	39,328	6,948
Arizona Eastern	367	171,803	29,006	211,794	24,212	20,946	2,047	50,714	1,112	10,740	109,772	102,022	12,460	89,334	1,887
Atchison, Topeka & Santa Fe	8,514	5,381,641	1,928,279	7,988,692	901,014	1,439,628	204,851	2,383,191	.....	155,528	5,083,689	2,905,003	407,534	2,496,504	—293,350
Atlanta & West Point	93	55,405	32,927	102,476	12,377	20,091	4,921	34,229	1,844	3,980	77,111	25,365	5,525	19,789	—244
Atlanta, Birmingham & Atlantic	639	195,959	29,546	245,089	39,744	45,339	11,093	99,120	.....	11,247	206,543	38,546	13,100	25,445	—25,860
Atlantic & St. Lawrence	167	122,500	21,260	158,198	15,348	23,615	4,325	76,540	.....	3,674	123,501	34,697	10,800	23,897	—6,513
Atlantic Coast Lines	4,701	2,258,379	772,888	3,302,789	362,474	440,251	48,468	1,006,441	15,453	73,318	1,944,414	1,358,376	138,000	1,220,238	—16,834
Baltimore & Ohio—System	4,516	5,803,992	983,977	7,352,832	611,426	1,054,494	168,510	2,671,373	43,435	179,904	4,729,089	2,623,743	281,234	2,340,391	279,117
Bangor & Aroostook	631	369,875	47,802	434,008	39,998	57,549	2,724	104,148	1,965	9,878	216,203	217,805	12,525	205,272	2,652
Belt Ry. Co. of Chicago	24	.....	.....	266,977	11,843	30,562	688	98,191	.....	5,930	147,215	119,762	11,690	108,073	—7,186
Buffalo & Susquehanna R. R. Corporation	253	99,824	6,197	108,859	18,968	42,424	1,050	34,279	.....	6,005	102,728	6,132	2,600	3,532	—19,558
Central of Georgia	1,924	797,449	204,838	1,110,235	137,689	170,281	31,799	357,105	1,743	37,894	735,192	375,043	50,287	323,615	—22,530
Central New England	304	295,513	33,385	344,945	35,751	32,316	1,526	98,170	.....	4,089	171,627	173,317	16,000	157,316	76,337
Chesapeake & Ohio Lines	2,372	2,640,588	421,248	3,270,842	347,785	677,127	51,871	1,127,894	17,983	67,940	2,273,284	997,558	115,009	882,424	14,803
Chicago & Alton	1,033	769,744	283,789	1,159,552	122,555	286,306	39,063	463,127	9,638	32,707	953,395	206,157	43,021	162,869	117,956
Chicago & Eastern Illinois	1,282	864,093	205,411	1,168,884	138,528	237,330	26,318	442,512	9,279	36,800	890,659	278,225	53,600	224,383	—51,954
Chicago & North Western	8,108	4,024,008	1,510,717	6,161,048	566,573	977,125	119,154	2,458,810	45,221	146,434	4,312,887	1,848,161	375,000	1,472,195	—459,166
Chicago, Burlington & Quincy	9,367	4,684,577	1,437,939	6,856,419	810,721	1,296,154	135,208	2,374,765	96,394	175,367	4,888,609	1,967,810	331,048	1,636,762	—714,222
Chicago Great Western	1,429	770,044	234,547	1,098,573	90,448	202,194	44,698	433,415	7,443	26,725	804,752	293,822	47,150	246,134	—43,088
Chicago, Indianapolis & Louisville	618	378,802	134,430	556,722	50,431	75,862	19,354	198,626	220	15,128	359,619	197,103	26,895	170,140	61,863
Chicago, Milwaukee & St. Paul	10,071	5,401,673	1,407,411	7,544,390	519,357	1,096,910	133,450	2,839,677	51,879	160,338	4,678,016	2,866,374	386,466	2,473,753	—310,906
Chicago, Peoria & St. Louis	255	103,517	19,136	130,015	19,512	27,234	6,083	56,928	.....	5,165	114,922	15,094	5,700	9,394	2,367
Chicago, Rock Island & Gulf	477	159,055	41,301	219,736	19,958	22,920	10,372	97,704	2,331	8,711	161,995	57,741	8,096	49,536	28,115
Chicago, Rock Island & Pacific	7,852	3,592,802	1,329,196	5,288,860	500,092	843,827	149,306	2,198,264	42,294	140,858	3,873,494	1,415,366	273,757	1,141,201	—113,689
Chicago, St. Paul, Minneapolis & Omaha	1,753	1,010,860	365,704	1,478,044	101,023	220,267	28,299	579,376	13,791	35,894	978,518	499,526	79,129	420,237	48,759
Cincinnati, Hamilton & Dayton	1,003	525,413	103,540	701,586	134,035	183,374	17,347	324,534	3,054	18,490	679,703	21,884	34,619	—12,875	2,326
Cincinnati, New Orleans & Tex. Pac.	337	621,906	118,982	784,101	72,966	161,940	26,049	251,230	8,134	18,712	539,033	245,068	31,000	213,983	—11,810
Cincinnati Northern	246	96,668	14,359	115,640	20,119	27,089	2,915	41,663	.....	3,800	95,585	20,055	5,500	14,549	15,137
Cleveland, Cincinnati, Chic. & St. Louis	2,381	2,047,268	616,905	2,916,739	300,648	652,301	77,575	1,139,719	21,807	64,641	2,246,726	670,013	128,000	540,910	332,345
Colorado Midland	338	91,041	8,714	110,133	16,052	34,194	7,748	47,584	682	5,743	112,003	—1,869	10,000	—11,869	—173
Colorado & Southern	1,089	466,355	81,475	594,764	61,094	150,046	8,646	191,320	3,390	20,694	435,190	159,574	35,600	123,973	—14,173
Cumberland Valley	164	179,138	49,364	240,719	32,427	25,548	6,612	80,032	875	9,313	154,807	85,912	5,794	80,117	12,095
Delaware, Lackawanna & Western	959	2,207,627	586,774	3,149,484	277,558	592,294	76,084	1,137,627	26,001	76,289	2,151,928	997,557	186,600	810,794	320,350
Detroit & Mackinac	400	70,434	22,094	98,292	8,355	18,154	1,783	33,044	.....	2,653	63,989	34,303	7,503	26,800	—8,100
Detroit, Grand Haven & Milwaukee	191	124,000	39,000	189,020	18,757	36,116	6,329	113,190	646	4,890	179,927	9,093	3,360	5,673	—6,930
Duluth & Iron Range	273	74,180	18,381	98,778	28,773	43,972	932	59,203	1,747	7,809	142,436	—43,658	6,633	—50,291	23,445
Duluth, Missabe & Northern	369	44,356	23,652	74,110	27,670	56,198	1,683	56,138	1,680	10,984	154,354	—80,244	3,740	—83,984	110,487
Duluth, South Shore & Atlantic	628	167,887	52,003	235,088	34,031	33,277	7,793	91,669	3,172	10,381	180,324	54,764	16,000	38,762	—20,261
El Paso & Southwestern Co.	1,027	530,799	105,206	685,757	97,542	91,037	22,515	176,345	6,065	25,434	418,937	266,820	34,889	231,930	—52,535
Elgin, Joliet & Eastern	776	702,855	2	745,690	71,089	125,800	5,169	210,545	.....	21,073	433,672	312,018	40,890	271,128	—53,424
Florence & Cripple Creek	87	88,742	15,950	106,312	10,020	12,624	2,509	29,226	.....	3,280	57,659	48,653	5,652	43,001	13,395
Florida East Coast	745	285,483	298,724	674,572	61,775	67,785	7,883	170,067	3,757	13,874	321,853	352,719	20,491	332,222	—36,699
Fort Worth & Denver City	454	290,602	89,950	403,936	54,124	76,088	5,762	164,887	1,901	15,271	318,033	85,903	12,621	73,283	26,330
Georgia, Southern & Florida	395	125,006	44,491	190,317	25,784	37,067	6,315	81,397	—279	10,806	161,091	29,226	10,122	19,060	—4,081
Grand Trunk Western	347	427,000	117,000	582,751	49,509	149,411	18,475	276,992	4,757	15,512	514,656	68,095	35,920	32,155	—30,652
Gulf & Ship Island	308	115,370	22,236	146,294	18,022	30,782	7,445	36,268	253	6,623	94,393	51,901	7,935	43,904	10,393
Illinois Central	4,767	3,735,179	979,823	5,103,745	659,289	1,126,755	100,748	1,835,505	28,835	130,801	3,872,332	1,231,414	269,400	960,829	—369,634
Indiana Harbor Belt	110	.....	.....	291,328	20,966	28,260	3,357	127,644	.....	7,948	188,175	103,153	8,080	95,037	—14,992
International & Great Northern	1,159	530,184	115,598	704,097	128,037	165,498	23,785	357,745	2,842	33,071	710,978	—6,880	40,000	—51,252	—75,974
Kanawha & Michigan	177	169,159	24,982	200,429	28,779	65,155	3,377	65,345	3	6,186	168,845	31,584	11,060	20,524	—52,527
Kansas City Southern	827	646,226	99,922	812,326	75,593	74,816	25,818	287,869	.....	36,771	496,436	315,890	48,170	267,044	—31,000
Lake Erie & Western	900	398,187	53,725	472,821	61,586	84,042	10,010	192,675	.....	12,955	361,267	111,554	22,000	89,526	1,508
Lehigh & New England	294	170,419	1,178	183,842	26,902	31,015	2,956	49,128	.....	5,913	115,914	67,928	5,104	62,823	—24,534
Lehigh Valley	1,443	2,750,762	262,237	3,232,529	289,796	621,875	81,813	1,243,065	9,489	83,515	2,329,452	903,077	142,500	760,435	251,481
Long Island	398	331,941	486,561	931,456	132,992	127,835	9,088	448,829	6,228	30,697	755,669	175,787	78,014	97,751	34,586
Louisiana & Arkansas	279	131,035	14,824	149,683	22,743	25,237	2,963	40,634	.....	4,261	95,838	53,845	7,500	46,345	3,629
Louisiana Ry. & Navigation Co.	350	153,868	24,671	188,592	31,697	19,665	5,688	68,974	.....	6,447	132,471	56,121	11,500	44,621	38,351
Louisville & Nashville	5,034	3,208,279	810,928	4,319,740	794,371	865,684	113,255	1,418,055	20,349	98,718	3,307,852	1,011,888	171,047	839,538	—337,651
Louisville, Henderson & St. Louis	200	77,171	28,684	112,532	24,945	17,627	5,627	36,484	.....	3,180	87,503	25,028	3,800	21,172	5,042
Maine Central	1,219	690,337	227,448	974,216	121,435	153,562	10,190	354,992	1,842	33,223	675,743	298,973	53,080	245,893	—53,851
Michigan Central	1,806	1,859,950	634,554	2,763,909	350,953	496,320	55,868	1,139,914	43,321	61,183	2,147,559	616,351	121,000	494,973	—67,497

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MARCH, 1915—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Midland Valley	380	$59,948	$30,724	$97,366	$20,959	$18,633	$2,242	$36,855	.....	$4,783	$83,472	$13,893	$4,749	$9,064	$4,888
Minn., St. Paul & Sault Ste. Marie	4,104	1,702,855	398,727	2,252,953	195,517	338,900	55,815	769,047	$12,031	51,622	1,421,613	831,340	87,435	743,905	—22,780
Missouri & North Arkansas	365	69,640	22,660	99,117	31,595	24,497	2,408	52,986	.....	6,004	117,489	—18,372	6,000	—24,487	—16,386
Missouri, Kansas & Texas System	3,865	2,013,855	574,481	2,784,387	386,249	308,981	54,293	1,042,547	21,343	85,274	1,890,111	894,276	112,584	781,264	382,921
Missouri, Oklahoma & Gulf	334	78,616	15,303	98,406	24,160	22,963	4,276	48,880	111	14,003	114,393	—15,987	5,277	—21,274	—751
Missouri Pacific	3,920	1,604,297	331,794	2,122,003	299,715	448,535	55,988	923,555	6,073	52,820	1,786,685	335,318	98,590	234,653	—105,754
Monongahela	75	105,909	1,855	109,124	19,496	6,411	535	22,598	.....	2,130	51,170	57,954	1,810	56,144	—22,093
Nashville, Chattanooga & St. Louis	1,231	658,191	183,924	923,237	161,286	173,401	51,203	359,772	9,044	32,018	786,700	136,537	26,000	110,259	—106,453
New Orleans & North Eastern	204	235,613	40,342	303,901	31,901	67,695	9,840	110,817	5,565	10,986	236,804	67,097	14,500	52,597	5,882
New Orleans Great Northern	283	100,538	17,881	130,206	17,200	22,570	3,198	190	5,787	190	89,495	40,711	3,169	37,427	—17,271
New Orleans, Mobile & Chicago	403	128,123	19,362	152,913	28,296	17,629	3,844	54,206	Cr. —6	7,398	111,366	41,547	6,386	35,059	—12,867
New Orleans, Texas & Mexico	286	106,194	19,536	131,978	16,900	20,235	4,578	53,393	.....	9,893	104,998	26,980	1,501	25,479	42,191
New York, Chicago & St. Louis	568	838,245	76,150	953,559	92,233	169,034	42,074	462,399	4,447	21,970	792,157	161,402	40,000	121,308	24,415
New York, New Haven & Hartford	2,003	2,736,172	2,033,278	5,351,512	499,850	850,704	35,046	2,013,967	51,867	131,492	3,586,672	1,770,841	190,000	1,578,145	522,014
New York, Ontario & Western	568	452,238	71,887	629,020	63,863	126,215	9,349	278,011	.....	16,971	494,409	134,611	20,000	114,610	17,364
New York, Philadelphia & Norfolk	112	245,985	30,772	296,203	25,737	64,327	4,139	133,501	4,289	10,598	242,590	53,612	9,500	44,088	15,033
Norfolk & Western	2,044	2,969,380	331,168	3,424,121	394,572	655,359	54,002	1,011,351	8,467	66,221	2,181,892	1,242,228	68,000	1,074,087	12,409
Norfolk Southern	900	275,251	64,611	358,712	48,881	48,660	7,043	135,605	69	18,764	259,023	99,689	9,977	89,711	1,820
Northern Pacific	6,497	3,437,903	913,583	4,771,441	429,906	570,807	106,350	1,477,678	68,962	88,670	2,692,384	2,079,056	376,532	1,701,827	362,938
Pennsylvania *Company*	1,757	2,955,947	711,655	4,025,642	479,325	828,982	70,725	1,589,273	30,912	110,126	3,109,343	916,298	256,975	658,789	22,761
Pennsylvania *Railroad*	4,512	10,662,121	2,774,829	14,624,857	2,034,382	3,292,195	192,670	5,669,072	214,021	424,810	11,827,151	2,797,706	633,111	2,161,232	—299,800
Philadelphia, Baltimore & Washington	717	823,208	613,436	1,588,993	234,283	341,230	25,789	707,066	31	56,418	1,364,816	224,177	53,970	170,144	42,298
Pittsburgh, Cincinnati, Chic. & St. Louis	1,479	2,205,068	601,945	3,117,130	343,838	653,310	65,198	1,195,031	26,791	80,622	2,364,789	752,341	154,542	597,782	35,489
Rutland	468	151,638	81,868	264,772	28,770	46,579	9,537	109,615	925	6,336	201,761	63,010	16,859	46,151	38,329
St. Joseph & Grand Island	258	75,897	19,932	102,843	18,014	21,620	4,922	49,093	.....	4,946	98,595	4,247	7,620	—3,378	—24,195
St. Louis & San Francisco	4,749	2,453,300	718,048	3,393,720	384,233	534,133	65,854	1,119,913	.....	98,516	2,182,688	1,211,032	108,949	1,100,400	274,756
St. Louis, Brownsville & Mexico	548	131,128	54,543	201,745	32,060	23,548	5,781	65,604	.....	10,579	137,305	64,440	6,500	57,813	—5,103
St. Louis, Iron Mountain & Southern	3,364	1,906,583	381,880	2,478,581	341,178	479,101	65,593	764,644	7,289	70,300	1,728,106	750,475	111,032	637,049	—287,557
St. Louis Merchants' Bridge Terminal	9	.....	186	166,499	17,082	10,403	772	81,824	.....	6,060	116,141	50,359	6,540	43,817	13,625
St. Louis Southwestern	943	468,506	78,375	576,622	53,552	93,380	25,804	167,145	3,006	27,798	370,588	206,033	35,207	170,496	—73,494
St. Louis Southwestern of Texas	811	215,385	55,543	294,537	70,425	68,720	11,606	165,166	674	18,114	314,329	—19,792	15,024	—34,954	57,688
San Antonio & Aransas Pass	724	178,498	60,984	259,427	78,645	56,939	6,448	144,899	.....	12,134	298,982	—39,555	14,077	—53,742	30,717
San Pedro, Los Angeles & Salt Lake	1,132	554,929	215,804	839,992	63,895	106,892	31,531	261,974	18,896	17,669	500,857	339,135	46,025	293,099	112,928
Seaboard	3,101	1,427,776	410,919	2,072,233	221,282	299,201	67,574	702,064	16,317	56,648	1,363,086	709,147	86,014	620,923	—144,803
Southern in Mississippi	281	44,887	19,484	69,668	21,249	9,953	2,860	37,502	.....	3,751	75,316	—5,647	8,375	—14,051	—16,224
Southern Pacific	6,517	4,772,721	2,544,623	8,168,656	820,894	1,247,048	164,435	2,575,171	144,861	228,728	5,138,547	3,030,109	340,848	2,686,208	178,430
Spokane International	163	37,955	10,652	51,193	9,152	4,297	2,154	18,240	3	3,166	37,011	14,182	3,858	10,324	—14,828
Union R. R. of Baltimore	9	111,238	18,021	130,927	16,663	.....	.....	4,429	.....	2,342	23,434	107,492	5,936	101,557	3,580
Union R. R. of Pennsylvania	31	.....	.....	223,008	24,964	81,989	204	125,103	.....	4,335	236,595	—13,587	5,300	—18,887	46,090
Vicksburg, Shreveport & Pacific	171	65,768	27,294	106,115	25,305	27,390	2,674	41,338	1,819	4,981	103,507	2,608	7,100	—4,492	—26,294
Washington Southern	36	36,769	46,349	112,275	16,586	12,397	1,021	42,652	2,201	3,021	77,877	34,398	3,236	31,019	—2,970
West Jersey & Seashore	356	169,780	234,182	442,634	93,527	94,977	11,286	236,459	2,237	14,508	452,994	—10,359	28,464	—38,836	—18,242
Western Maryland	661	661,313	63,611	756,209	96,333	133,298	21,578	260,030	3,540	19,405	534,114	222,095	25,500	196,595	197,199
Western Ry. of Alabama	133	70,600	30,546	111,898	18,738	22,113	5,329	32,532	1,744	4,783	85,239	26,659	5,113	21,525	—8,884
Wheeling & Lake Erie	459	333,470	39,472	410,862	39,600	92,650	11,005	178,065	1,196	13,533	336,048	74,814	31,152	43,661	—184,190
Yazoo & Mississippi Valley	1,382	798,694	147,752	998,059	148,073	140,268	17,637	382,721	2,082	26,041	716,519	281,540	51,000	230,225	—20,009
EIGHT MONTHS OF FISCAL YEAR ENDING JUNE 30, 1915															
*Kansas City, Mexico & Orient	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oahu Railway & Land Co	109	$614,450	$175,963	$844,631	$82,948	$71,690	$5,217	$172,381	.....	$34,555	$366,791	$477,840	$57,522	$420,318	$28,468
Pittsburgh, Shawmut & Northern	294	1,168,731	84,927	1,269,921	235,278	341,575	13,333	420,908	.....	32,743	1,043,837	226,084	13,013	213,071	5,812
NINE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1915															
Alabama & Vicksburg	143	$716,087	$387,448	$1,130,173	$174,869	$284,719	$33,074	$435,286	$24,632	$50,767	$1,003,347	$126,826	$68,986	$57,840	—$151,983
Alabama Great Southern	309	2,459,974	793,426	3,557,836	415,118	863,402	123,276	1,264,028	27,146	83,191	2,754,115	803,721	138,498	665,021	—193,959
Ann Arbor	294	1,216,506	409,530	1,738,266	178,438	240,878	45,018	712,473	3,427	66,697	1,246,932	491,334	111,720	379,173	10,443
Arizona Eastern	367	1,190,102	235,359	1,539,063	248,520	204,342	18,988	425,328	9,441	92,523	999,105	539,957	116,370	423,038	—296,121
Atchison, Topeka & Santa Fe	8,514	48,657,385	17,740,521	72,422,988	9,810,380	12,583,408	1,563,912	20,666,194	.....	1,389,846	45,965,666	26,457,321	3,550,164	22,892,393	1,827,332
Atlanta & West Point	93	446,041	327,546	895,940	132,500	207,940	48,389	286,430	14,819	40,850	730,534	165,406	58,504	106,632	—82,645
Atlanta, Birmingham & Atlantic	639	1,464,064	393,043	2,030,920	319,736	400,213	110,933	882,704	.....	94,069	1,807,656	223,264	108,293	114,568	—300,612
Atlantic & St. Lawrence	167	900,618	242,344	1,254,303	168,141	195,615	37,579	551,307	.....	30,920	983,562	270,742	97,200	173,542	75,161
Atlantic Coast Lines	4,701	15,627,765	6,115,223	23,635,100	3,485,360	4,095,792	510,315	8,481,750	85,862	667,433	17,282,647	6,352,453	1,242,000	5,107,092	—2,031,475
Baltimore & Ohio—System	4,516	51,541,230	10,741,903	67,446,586	6,740,092	12,092,699	1,431,669	26,153,544	411,604	1,583,823	48,411,922	19,034,665	2,454,356	16,567,946	12,811

*Reorganized July 6 and 8, 1914. No cumulative figures shown.

Traffic News

The Louisville & Nashville has asked state authority to advance passenger fares on all branch lines in Alabama from 2½ cents a mile to three cents.

Vigorous protests have been filed by newspapers against the increase in freight rates on paper, announced last week, to take effect May 27, in Official Classification territory.

The Chicago, Milwaukee & St. Paul has made arrangements to operate 125 special trains to California and the North Pacific coast for conventions and meetings of various organizations between May 1 and September 5.

The Cape Cod Canal, connecting Buzzards and Cape Cod bays, Massachusetts, announces that rates for passage through the canal have been reduced. Vessels drawing 18 ft. of water may now pass through the canal. The company has added to its tariff a schedule of rates for towing sailing vessels through the canal.

The Baltimore & Ohio on May 1 advanced passenger rates in West Virginia to the basis of 2½ cents a mile, attaching to each ticket a conditional rebate coupon, saving the passenger from loss in case the railroad commission should be able to carry out its purpose to forbid the discontinuance of the two-cent rate.

The railroads carrying grain from Buffalo to the Atlantic Seaboard have filed new tariffs reducing from ten days to five days the time allowed for free storage of grain in the elevators at Buffalo. This storage allowance is an element in the rate of transportation from Buffalo to the seaboard and shippers are expected to protest against the change.

The post office department has filed with the Interstate Commerce Commission a complaint that railroad freight charges on stamped envelopes from Dayton, Ohio, are unreasonably high as compared with rates on similar goods sent by ordinary shippers. Stamped envelopes are charged first-class, and other envelopes and paper, it is alleged, are carried at third-class and fifth-class.

The nominating committee of the Traffic Club of Pittsburgh has nominated the following candidates for the various offices of the club to be voted upon at the June meeting: President, William H. Sproull; first vice-presidents, T. W. Bennett, Ralph W. Cooke and W. E. Whitemore; second vice-presidents, Charles B. Ellis, Edwin C. Jepson and John F. Lent; secretary, P. L. Wells, and treasurer, James T. Meison.

The southeastern railways have notified the Interstate Commerce Commission that they have prepared an amended classification providing that after June 3 freight rates will be increased 10 per cent, unless shippers accept the railroads' bill of lading; but this change is understood to be based on a new form of bill of lading, the terms of which have not been made public. The carriers are considering changes in rules which, evidently, are designed to provide for increased rates where the liability of the carrier is increased by the Cummins law, while retaining those conditions, printed in the bill-of-lading form, which are not affected by this law.

The Merchants' Association, New York City, reports that the freight sent from New York to Pacific coast ports through the Panama Canal during the first eight months of business amounted in value to $41,202,591, which is 90 per cent of the value of all freight moving through the canal from the Atlantic to the Pacific. Three companies are now operating a regular steamship service through the canal, and since the beginning of January a vessel has left New York on an average of every three days. The passenger steamships of the International Mercantile Marine Company, which have been put on the route between New York and San Francisco, as announced in the *Railway Age Gazette*, April 30, p. 945, are to sail fortnightly. Of the freight shipped from New York during the last eight months, more than nine-tenths started from some point outside of New York City; and some of it came from as far west as Davenport, Iowa, and Sheboygan, Wis. Among the commodities carried have been starch from Iowa, beer from St. Louis and Milwaukee, cotton goods from North Carolina and flour from Minneapolis.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The hearing before the commission on proposed advances in western passenger fares set for May 17, has been postponed to July 6, at the request of the western state railway commissions.

The commission has suspended from May 1 to August 29 a proposed increase of 30 cents a ton in the rate on bituminous coal from Chicago to Redwing, Minn., and intermediate points on the Chicago Great Western, applicable on traffic originating at mines in Kentucky.

The commission has suspended tariffs of the Louisville & Nashville and the Cincinnati, New Orleans & Texas Pacific proposing to cancel the present joint through rates on bituminous coal in carloads from the Kanawha district of West Virginia to points in Kentucky.

The commission has suspended a tariff of the Chicago & North Western proposing changes in the rules governing the eastern shipment of wool. This tariff provides for the withdrawal of the commodity rate of 86 cents a 100 lb. on wool in carloads from Belle Fouche and other points in South Dakota to Winona, Minn., destined to Buffalo, Pittsburgh and other eastern termini.

A hearing on the tariffs filed by the railroads canceling the privilege of stopping freight trains for loading and unloading in transit was held before Examiner Bell of the commission on April 30. James Webster, assistant freight traffic manager of the New York Central Lines, testified for the eastern lines and W. A. Poteet, chairman of the Trans-Missouri Freight Bureau, testified on behalf of the western lines.

Jurisdiction Over Urban Electric Lines

Opinion by the commission:

Electric railways, other than street passenger railways, participating in the interstate movement of persons or property are in this case held subject to the requirements of the commission relative to the filing of reports of finances and operations and accidents. Railway companies which provide both street-car or other intrastate service and interstate service should, however, restrict the scope of their monthly reports of accidents so as to include only accidents resulting from the operation of cars engaged in the transportation of passengers and property in interstate commerce. (33 I. C. C., 536.)

Fourth Section Applications in Rates on Grain to Jackson and Meridian, Miss.

Opinion by the commission:

The carriers are authorized to continue rates on grain and grain products from Omaha, Neb., St. Louis, Mo., and Ohio river crossings to Jackson and Meridian, Miss., on the basis of combination on Vicksburg, Miss., lower than rates concurrently applicable on like traffic to intermediate points.

Authority to continue rates between Vicksburg, Miss., and stations on the Alabama & Vicksburg applying on grain and grain products, that result in higher charges on grain and grain products from Omaha, St. Louis and Ohio river crossings to intermediate points than to Jackson and Meridian are, however, denied. (33 I. C. C., 613.)

Rates on Toasted Wheat Biscuit

Kellogg Toasted Corn Flake Company v. Atchison, Topeka & Santa Fe et al. Opinion by the commission:

The rates charged by defendants for the interstate transportation of toasted wheat biscuit and toasted wheat krumbles in carloads in western trunk line and southwestern territories are found to be discrimatory in that they exceed the rates on cream of wheat, Post tavern porridge and like uncooked cereal foods in carloads between the same points. The commodities are of substantially the same value; the transportation conditions are sub-

stantially similar, and both classes are rated the same in the official, southern and western classifications, different ratings being maintained only in the territory in controversy by special commodity tariffs and exceptions to the classifications. (33 I. C. C., 534.)

Rates on Paper From New England Points to New York

Opinion by the commission:

Paper in less than carloads is rated third class in the official classification. Respondents, the Boston & Maine, the Boston & Albany and the New York, New Haven & Hartford, publish less than carload commodity rates from producing points on their lines in New England to New York and New York delivery points lower than third class. In the tariffs under consideration it is proposed to cancel these commodity rates leaving the class rates in effect. The Boston & Maine has since proposed a scale of rates higher than the present rates, but somewhat lower than the rates under consideration. It is found that these rates and the rates proposed by the Boston & Albany and the New Haven in the suspended tariffs are justified. (33 I. C. C., 609.)

Joint Rates With the Chicago, Ottawa & Peoria

Chicago, Ottawa & Peoria v. Chicago & North Western et al. Opinion by Commissioner Harlan:

The complainants operate an electric railway in Illinois from Princeton in an easterly direction through Peru, La Salle, Ottawa and Morris to Joliet, with branch lines southward from Ottawa to Streator and northward from Hicks Junction to Ladd. It is a part of the Illinois Traction system, although it has no physical connection with that system and already has joint rates on interstate traffic with some of the trunk lines. In this proceeding it asks that the defendants be required to establish through routes and joint rates on all interstate traffic between points on defendants' lines and points on its own rails. The commission finds that there is no public necessity for the routes and rates asked for, as the shippers and receivers of freight at all the towns reached by the electric railway now have joint rates over steam roads to all points reached by such roads, at as low rates, and with as efficient service as would result from the establishment of the through routes and joint rates asked. (33 I. C. C., 573.)

Lumber Transit Privileges at Buffalo

Buffalo Lumber Exchange and Buffalo Chamber of Commerce v. Alabama Central et al. Opinion by Commissioner McChord:

The commission finds that the carriers have not justified proposed increased rates on hardwood lumber from southern points, stopped in transit at Buffalo, and reconsigned to points east, northeast and southeast thereof. It was shown that these proposed increased rates were largely the result of a dispute between the carriers as to divisions.

The rates, regulations and practices of the southern carriers applying on this traffic were not found unreasonable or discriminatory, except as to the rule published by Morgan's Louisiana & Texas providing for the application of combination rates on shipments routed over certain lines, which was found unreasonable. (33 I. C. C., 601.)

Proportional Rates on Grain Products From Omaha to Destinations South of the Ohio

Opinion by Commissioner Clements:

The Illinois Central has proposed to increase the rates on grain products from Omaha to destinations local to its lines in the Mississippi valley in order to bring them in harmony with the general rate adjustment as between Omaha, Kansas City and St. Louis, primary grain markets. No change is proposed in the grain products' rates to Mississippi river points, or to competitive points on the Illinois Central.

The commission finds that the carrier has justified the increases in the rates from Omaha to the destinations here involved south of Montgomery, Miss. It has not, however, justified increases in the rates to stations north of Elton, Miss., nor the full increases to destinations south of and including Elton, to and including Montgomery. Maximum rates to these stations are prescribed for flour, coarse grain products and oatmeal. (33 I. C. C., 621.)

Joint Rates With the Campbell's Creek Railroad

Campbell's Creek Coal Company v. Ann Arbor et al. Opinion by Commissioner Meyer:

The commission in its original findings in this case held that the Kanawha & Michigan discriminated against the Campbell's Creek Railroad in that it awarded main-line or Kanawha district rates on coal from points on the Kanawha & West Virginia and the Coal & Coke, while it did not award such rates to points on the Campbell's Creek. The carrier was directed to eliminate this discrimination, either by cancelling the main-line rates from points on the Coal & Coke and the Kanawha & West Virginia, or by establishing these rates as joint rates with the Campbell's Creek. The Kanawha & Michigan elected to cancel the main line rates with the Coal & Coke and the Kanawha & West Virginia.

The commission now holds that main-line or district rates applying from points on the Coal & Coke and the Kanawha & West Virginia should be continued, and that through routes and joint rates should be established from points on the Campbell's Creek. Such rates should not exceed the main line or distinct rates applying from points on the other two roads. (33 I. C. C., 558.)

STATE COMMISSIONS

The New York State Public Service Commission, Second district, has suspended, until July 1, proposed increases in commutation passenger fares on the Long Island Railroad.

The railroads have completed their testimony before the Kansas Public Utilities Commission on their petition for authority to increase passenger fares, and the commission has adjourned to a date to be fixed later, when the commercial travelers, who are opposing the advance, will be given an opportunity to be heard.

PERSONNEL OF COMMISSIONS

Clinton White, a member of the Massachusetts Public Service Commission and of its predecessor, the Railroad Commission, for many years, announces that on May 17 he is going to retire, that being the day on which he will reach the age of 70.

COURT NEWS

The Supreme Court of Missouri has authorized 11 railroads in that state to file briefs in the case instituted by the attorney general of the state against the Chicago & Alton to recover excess charges collected while the freight and passenger rate laws were in litigation. The circuit court of Saline county decided this case in favor of the railroad, holding that the attorney general could not recover the charges on behalf of the state or unnamed shippers.

In the Supreme Court of the United States the government has won its suit against the Erie Railroad to recover penalties for violation of the safety appliance laws in the movement of freight trains between Jersey City, N. J. and Weehawken, about two miles. The road had claimed that the movement of trains in question was essentially a yard or switching movement; but the court finds that, by reasonable interpretation, these should be called main line movements. The lower court is ordered to grant a new trial, two decisions, those of the district court and of the circuit court of appeals, having been in favor of the road. This decision settles in favor of the government a similar suit against the Chicago, Burlington & Quincy, relating to movements in Kansas City.

Right of Way—Abandonment

The conveyance of a strip of land to a railroad company for a right of way, "to have and to hold the same for and so long as the same is used for railroad purposes," is held by the Minnesota Supreme Court to convey an easement only, and not the absolute fee-simple title. An easement so held may be lost by abandonment. In the present instance a track of the Duluth Transfer, owned by the Northern Pacific, had been taken up by the latter, and for ten years no use had been made of the right of way for any purpose. It was held that there was an intentional abandonment of the right of way. Norton v. Duluth Transfer (Minn.), 151 N. W., 907.

Duty to Keep Ticket Office Open

Railroad companies in Kentucky are required by statute to keep their ticket offices open at least 30 minutes immediately preceding the schedule time of departure of passenger trains. A passenger without a ticket boarded a train at a station where there was a ticket office. The train was about seven minutes late. The ticket office had been kept open until about seven minutes after the schedule time of departure, when the agent left the office to attend to outside duties. The passenger arrived at the station after schedule time. It was held by the Kentucky Court of Appeals that he might be required to pay the extra flat charge of 10 cents, the statute having been complied with. Ponder v. Lexington & Eastern (Ky.), 174 S. W., 786.

Derailing Devices—Unreasonable Order

The Litchfield & M. allowed an electric road to cross its line under an agreement that the latter was to construct and maintain a derailing device, and L. & M. trains always to have precedence. An order of the Illinois Railroad and Warehouse Commission, reversing the obligations and rights under the agreement, required the electric road, running about 40 trains a day, to install interlocking, at a cost of $4,200, gave it equal rights of crossing, and required the L. & M., running four or five trains a day, to assume the expense of operating the interlocking and to stop its trains, when necessary, at an expense of $1.08 for a loaded train and 83 cents for a train not loaded. The Illinois Supreme Court holds the order to be unreasonable; and that a fair apportionment of the cost of operation would require each road to bear the expense in proportion to the number of times which each used the crossing. Railroad and Warehouse Commission v. Litchfield & M. (Ill.), 108 N. E., 347.

Establishment of Stations—Reasonableness of Order

The Railroad Commissioners of Florida having issued an order requiring the Florida East Coast to establish and maintain an agency station at Mims, the Florida Supreme Court holds that the duty of a railroad company to provide fit and suitable roadbeds and tracks and rolling stock may be distinguished from the duty to provide stations along its line The one is an essentially higher and more important duty than the other. In the latter case the fact that the performance of the duty will be unremunerative may be considered In the present case it appeared that the road is operated at a loss, that its stockholders receive no dividends, that there is no sinking fund, that its income is not sufficient to pay the interest on its bonds, and that ample accommodation for the business received existed at Mims. It was held that if these facts were true the order was unreasonable, and the railroad company was entitled to an opportunity to prove them. No evidence having been taken, the order was subject to be set aside. State v. Florida East Coast (Fla.), 67 So., 906.

Taxation—Intangible Elements of Value

The Supreme Court of the State of Washington upholds as valid and constitutional the assessment, for 1913, of the Northern Pacific's operating property within the state, as a unit, at $126,000,000, including an added item of $12,290,000 on account of density of traffic and volume of business along its line, the nature of the country through which its line ran, the facilities for transacting railroad business owned by private individuals, such as warehouses and docks, the proximity of extensive coal mines enabling it to obtain coal at reduced cost, regardless of its ownership, the resources of the country adjacent to its line, and the density of population and development of the tributary territory, considered as intangible elements affecting the value of its operating property.

It was also held that, in the absence of any willful fraudulent acts charged against either the state board of tax commissioners making the assessment or the state board of equalization adopting it, or any charge that such boards refused to hear evidence as to value or acted arbitrarily, the assessment, where the difference between the assessed value and the actual value was as small as 10 per cent, would not be interfered with by the court purely on the ground that it was excessive, and because of a radical change in conditions resulting in large decrease in net earnings of the property and a permanent impairment of its value. Northern Pacific v. State (Wash.), 147 Pac., 45.

Railway Officers

Executive, Financial, Legal and Accounting

Alden B. Muller has been appointed secretary and treasurer of the Texas-Mexican, with office at Laredo, Tex., succeeding John F. Boniger, deceased.

William Gerig, vice-president, general manager, treasurer and chief engineer of the Pacific & Eastern at Medford, Ore., has resigned to take a position in connection with the work on the union depot at St. Paul.

G. J. Bunting, whose appointment as general auditor of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has already been announced, was born July 14, 1881, at Portsmouth, Va., and was educated in the common and high schools. After his graduation from high school he completed his education under private tutorage. In 1900 he was made general accountant of the Cashie & Chowan road in North Carolina and later held positions with two large public accounting agencies, the Audit Company of New York and the Indiana Audit Company. In May, 1909, he was appointed examiner of accounts for the Interstate Commerce Commission and remained in that position until July 15, 1911, when he was appointed general accountant for the Chicago, Milwaukee & St. Paul at Chicago. On March 15, 1913, he was appointed assistant general auditor of the road, from which position he is now promoted.

G. J. Bunting

Walter Platt Cooke, whose election as president of the New Orleans Great Northern, with headquatrers at Buffalo, N. Y., has already been announced in these columns, was born on April 28, 1869, at Buffalo, N. Y. He was educated in the public and high schools of his native town, and in 1891 graduated from Cornell University. He engaged in the practice of law in Buffalo, and is a member of the firm of Kenefick, Cooke, Mitchell & Bass. Mr. Cooke is an executor of the Frank H. Goodyear estate, and has been in charge of the estate for several years. Mr. Goodyear was one of the founders of the Great Southern Lumber Company, and his estate owns a large interest in that company as well as in the stock of the New Orleans Great Northern Railroad. Mr. Cooke has been chairman of the executive committee for four years of the Great Southern Lumber Company and of the New Orleans Great Northern Railroad, and for over a year has been first vice-president and general counsel of the railroad company.

W. P. Cooke

J. R. Stephens, chief engineer of the Missouri Pacific and the St. Louis, Iron Mountain & Southern, has been appointed assistant to the president, with headquarters at St. Louis, succeeding A. Robertson, promoted.

E. N. Renfrew, auditor of agencies of the New York, New Haven & Hartford, the Central New England and the New England Steamship Company at New Haven, Conn., has been appointed auditor of miscellaneous receipts, with office at New Haven. He will have charge of all miscellaneous revenue and will also continue to perform the duties of auditor of agencies.

L. R. Wood, whose appointment as auditor of the Oregon Short Line, with headquarters at Salt Lake City, Utah, has already been announced, was born November 20, 1875, at Denison, Iowa, and was educated in the common, high and business schools. He entered railway service February 10, 1899, in the traffic department of the Fremont, Elkhorn & Missouri Valley. From February 20, 1900, to July 1, 1905, he was stenographer to the auditor of disbursements of the Union Pacific, and from July 1, 1905, to January 1, 1910, he was general clerk in the general auditor's office of the Union Pacific-Southern Pacific system. In January, 1910, he was made assistant chief clerk to the vice-president and controller of the same road, and held that position until March 1, 1912, when he was made chief clerk to the auditor of the Oregon Short Line. On April 11, 1914, he was appointed assistant auditor of the Oregan Short Line, from which position he is now promoted.

Henry Watkins Miller, whose election as vice-president of the Southern Railway, with headquarters at Atlanta, Ga., has already been announced in these columns, was born on August 8, 1868, at Raleigh, N. C., and was educated in the public and private schools of his native city. In October, 1885, he entered the service of the Richmond & Danville as loading clerk at the Raleigh freight house and as relief telegraph operator. He was advanced to billing clerk and then chief clerk at this station, and later became rate clerk in the division freight office. In September, 1888, he left the traffic department to become chief clerk and secretary to the third vice-president of the same road, becoming secretary to the second vice-president on the organization of the Southern Railway, and from 1894 to December, 1901, was secretary to the first vice-president. He was then appointed assistant to the first vice-president, and in December, 1910, was appointed assistant to president, which position he held at the time of his recent election as vice-president of the same road as above noted. He has also served as secretary of various subsidiary lines of the Southern Railway, and has recently been elected vice-president of the Danville & Western; Blue Ridge Railway; Augusta Southern; Tallulah Falls, and the Hartwell Railway Company. He is also president of the Kentucky & Indiana Terminal Railroad Company, and of the Durham Union Station.

H. W. Miller

Operating

A. L. Christiansen has been appointed superintendent of car service of the Elgin, Joliet & Eastern, with office at Joliet, Ill.

J. L. Marquette, trainmaster of the Western division of the Chicago & Alton, has been appointed assistant superintendent, with headquatrers at Slater, Mo.

F. M. Metcalfe has been appointed to be in charge of the bureau of efficiency of the Northern Pacific, with headquarters at St. Paul, succeeding Charles T. Banks, resigned.

Traffic

John Redding, contracting agent of the Wabash at Toledo, Ohio, has been promoted to commercial agent, with headquarters at Toledo.

John S. Campbell has been appointed district agent of the Pennsylvania Lines and Union Line at Portland, Ore., succeeding F. N. Kollock, retired under the pension system.

A. S. Edmonds, general agent of the Missouri Pacific-Iron Mountain System, at Philadelphia, has been appointed traffic manager of the Chesapeake Steamship Company, of Baltimore.

E. M. Meagher, chief clerk in the office of the general freight and passenger agent of the Buffalo & Susquehanna, at Buffalo, N. Y., has been appointed acting general freight and passenger agent, with headquarters at Buffalo.

J. F. Blumensteil, division freight agent of the Detroit, Toledo & Ironton at Springfield, Ohio, has resigned to engage in other business. H. A. Fidler, assistant general freight agent at Ironton, Ohio, has been transferred to Springfield.

Horace Emerson has been appointed commercial agent of the Atlantic Coast Line, with headquarters at Sumter, S. C. E. M. Finch, commercial agent at Montgomery, Ala., has been appointed commercial agent, at Ocala, Fla., vice H. H. Brand, deceased, and the position of commercial agent at Montgomery has been abolished. Pendleton Goodall, commercial agent at Cincinnati, Ohio, has been appointed commercial agent at St. Louis, Mo., vice C. H. Trimble, deceased, and E. H. Smith succeeds Mr. Goodall.

J. M. Johnson, vice-president in charge of traffic of the Missouri Pacific-Iron Mountain System and the Denver & Rio Grande, has moved his headquarters from St. Louis to Chicago. W. A. Rambach, assistant to the vice-president, with headquarters in Chicago, has been appointed assistant freight traffic manager in charge of rates, etc., with headquarters at St. Louis. J. N. Githens, assistant to the vice-president, has been appointed assistant freight traffic manager in charge of solicitation, with headquarters in St. Louis. W. I. Jones, assistant to the vice-president, has been promoted to general freight agent of the Iron Mountain, to succeed E. H. Calef, deceased. C. C. P. Rausch, assistant-general freight agent at St. Louis, has been promoted to general freight agent. His duties will consist of appearing before the different railroad commissions and such other work as may be assigned him. D. R. Lincoln, assistant-general freight agent, with headquarters in Kansas City, has been transferred to St. Louis, with the same title, but with increased duties and responsibilities. W. H. Alexander, assistant-general freight agent at St. Louis, has been transferred to Kansas City to take up the work formerly performed by Mr. Lincoln.

Engineering and Rolling Stock

W. H. Winterrowd, mechanical engineer of the Canadian Pacific at Montreal, Que., has been appointed assistant to the chief mechanical engineer, with headquarters at Montreal.

E. A. Hadley, assistant engineer of the Missouri Pacific and the St. Louis, Iron Mountain & Southern, has been appointed chief engineer, with headquarters at St. Louis, succeeding J. R Stephens, promoted.

O. E. Selby, engineer of bridges and structures of the Cleveland, Cincinnati, Chicago & St. Louis and the Peoria & Eastern at Cincinnati, Ohio, has been appointed principal assistant engineer, and J. B. Hunley succeeds Mr. Selby.

Harry A. Macbeth, who has been appointed superintendent of motive power of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, succeeding E. A. Miller, deceased, was born on September 23, 1867, at Wellsville, Ohio. He was educated in the common and high schools and entered railway service in October, 1883, with the New York, Chicago & St. Louis. He was machinist apprentice from 1884 until 1887, machinist from 1887 to 1891, gang foreman from 1891 to 1898, when he was appointed general foreman. This position he held until 1905, when he was appointed master mechanic, and he has served in that capacity for the last 10 years, recently with headquarters at

Conneaut, Ohio, from which position he is now promoted to superintendent of motive power.

Charles W. Van Buren, who has been appointed general master car builder of the Canadian Pacific, with headquarters at Montreal, Que., as has already been announced in these columns, was born on October 18, 1867, in Rensselaer county. N. Y. He went to the common schools until he was 16 years old, and for a year attended night school in New York City. In 1889 he began railway work on the New York Central & Hudson River. He was a carpenter at the West Albany shops until 1891, when he was made foreman, and two years later he was put in charge of car department work on the Adirondack division at Herkimer, N. Y. In 1896 he was transferred to Utica in charge of car department work on the Adirondack and the Mohawk divisions of the New York Central & Hudson River and the West Shore. He entered the service of the Canadian Pacific in July, 1905, as general car inspector on the lines east of Port Arthur. The following year he was appointed division car foreman of the Eastern division, remaining in that position until July, 1909, and then served as master car builder of the eastern lines of the same road, with headquarters at Montreal, until May, 1911. He then went to the Union Stock Yard & Transit Company, Chicago, as assistant general superintendent, remaining with that company until January, 1915, when he was appointed general foreman of the Milwaukee Refrigerator Transit & Car Company, at Milwaukee, Wis., which position he held until his recent appointment as general master car builder of the Canadian Pacific, as above noted.

Purchasing

E. J. Urtel, chief clerk in the president's office of the Buffalo & Susquehanna, at Buffalo, N. Y., has been appointed purchasing agent, with headquarters at Buffalo.

OBITUARY

Union B. Hunt, former chairman of the railroad commission of Indiana, died at Indianapolis on May 3.

E. H. Calef, general freight agent of the St. Louis, Iron Mountain & Southern, whose death on April 21, at his home in St. Louis, Mo., was briefly noted in these columns last week, was born in St. Louis in 1867. His entire railway career was on the Missouri Pacific-Iron Mountain system. He began railway work in January, 1884, as a messenger in the freight claim department and later became traveling freight agent in the Indian Territory and other fields. In 1899 he was appointed commercial agent at Sedalia, Mo., and in March, 1905, was appointed division freight agent of the Iron Mountain at Little Rock, Ark. In September, 1908, he was made assistant general freight agent, with headquarters at St. Louis, and on June 1, 1913, he was appointed general freight agent of that road, with office at St. Louis.

E. H. Calef

THE RAILWAYS OF BELGIUM.—It is reported from Brussels that the Germans have not only repaired almost all the railways in Belgium which were damaged through the war, but that they are also engaged on the construction of a new line from Aix-la-Chapelle via Visé-Glons to Brussels, avoiding Liége and the awkward curve of Ans. The railway on completion will considerably reduce the length of the connection between Germany and Brussels, Ghent, Antwerp and the coast.

Equipment and Supplies

LOCOMOTIVE BUILDING

THE WESTERN MARYLAND is in the market for 10 locomotives.

THE CHICAGO GREAT WESTERN is asking for bids on 5 switching locomotives.

THE FRENCH GOVERNMENT has issued specifications for 100 large locomotives.

THE CUBA RAILROAD has ordered 10 ten-wheel type locomotives from the American Locomotive Company.

THE PENNSYLVANIA RAILROAD has given its Juniata shops authority to proceed with the construction of 50 superheater Mikado type (L-l-s) locomotives.

CAR BUILDING

THE COLD BLAST TRANSPORTATION COMPANY is in the market for 300 refrigerator cars.

THE ATCHISON, TOPEKA & SANTA FE is said to be intending to build or buy a hospital car.

THE PITTSBURGH STEEL COMPANY has ordered 10 hopper cars from the Standard Steel Car Company

THE CONTRACTORS' SERVICE COMPANY, New York, is in the market for 45 50,000 to 60,000-lb. capacity, steel underframe flat cars not less than 32 feet long.

THE WESTERN MARYLAND, reported in the *Railway Age Gazette* of April 16 as contemplating the purchase of a number of passenger cars, is about to issue inquiries for these cars and for 1,000 coal cars.

THE PONCA REFINING COMPANY, reported in the *Railway Age Gazette* of April 16, as having ordered 100 tank cars from the American Car & Foundry Company, has now increased that order to 120 tank cars.

THE NEW YORK MUNICIPAL has ordered 100 steel subway cars from the American Car & Foundry Company. These cars are in addition to the 200 ordered in the latter part of 1914 and will be of the same type.

THE PENNSYLVANIA EQUIPMENT COMPANY is in the market for 100 or 150 40-ft., 80,000 to 100,000 lb. capacity flat cars, 1 second-hand combination passenger and baggage car and 2 combination passenger, mail and baggage cars.

THE CENTRAL LOCOMOTIVE & CAR WORKS is reported to be asking bids on trucks, castings and forgings for 1,000 freight cars, said to be in preparation for building 1,000 cars for the Minneapolis & St. Louis. This item has not been confirmed.

THE RUSSIAN GOVERNMENT is understood to have closed or to be about to close contracts with the Pressed Steel Car Company for railroad equipn.ent variously estimated to be worth from $10,000,000 to $40,000,000. The contracts are said to include from 10,000 to 17,500 all-steel freight cars.

IRON AND STEEL

THE ILLINOIS CENTRAL is in the market for 2,000 tons of angle bars.

THE BOSTON & MAINE is asking bids on about 1,000 tons of steel.

THE NORFOLK SOUTHERN is inquiring for 1,500 tons of steel rails.

THE LEHIGH & NEW ENGLAND is receiving bids on 300 tons of bridge material.

THE SOUTHERN has ordered 1,575 tons of steel rail from the Pennsylvania Steel Company.

THE MINNEAPOLIS & ST. LOUIS has ordered 5,000 tons of rails from the Illinois Steel Company.

THE NEW YORK, NEW HAVEN & HARTFORD is inquiring for about 200 tons of steel bridge material.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE has ordered 3,000 tons of rails from the Illinois Steel Company.

THE PITTSBURGH & LAKE ERIE is reported to have ordered 5,700 tons of rails from the Carnegie Steel Company.

THE NEW YORK CENTRAL is asking for bids on 300 tons of shapes for three bridges to be constructed at Jersey City.

THE CHICAGO, MILWAUKEE & ST. PAUL has ordered 119 tons of steel rods from the Minneapolis Steel & Machinery Company.

THE DALLAS UNION TERMINAL has ordered 215 tons of steel for train sheds at Dallas, Tex., from the American Bridge Company.

THE CENTRAL OF NEW JERSEY is asking for bids on 500 tons of fabricating steel for a bridge to be constructed in eastern Pennsylvania.

THE CINCINNATI, HAMILTON & DAYTON has asked for bids on three steel bridges for immediate delivery to cost approximately $200,000.

THE TEXAS & PACIFIC has ordered 273 tons of steel for a railroad crossing for the Dallas Terminal, Dallas, Tex., from the American Bridge Company.

THE WISCONSIN & NORTHERN has ordered 134 tons of steel for a 261-foot deck plate girder viaduct at Gresham, Wis., from the Wisconsin Bridge & Iron Company.

THE ATCHISON, TOPEKA & SANTA FE has ordered 230 tons of steel for two 100-foot turntables, one at Amarillo, Tex., and one at Wellington, Kan., from the American Bridge Company.

THE RUSSIAN GOVERNMENT is said to have issued inquiries in this country for bridge steel and rails to the value of $100,000,000. Negotiations are nearing completion with the Lackawanna Steel Company, whereby that company will supply 20,000 tons of rails.

THE GOVERNMENT RAILWAYS OF THE UNION OF SOUTH AFRICA, reported in the *Railway Age Gazette* of April 16 as having ordered 30,000 tons of rails from the Dominion Iron & Steel Company, have ordered 35,000 tons from that company. They are also reported to have ordered 35,000 tons from the Algoma Steel Corporation, Ltd.

MACHINERY AND TOOLS

THE CHESAPEAKE & OHIO is in the market for a planer and a vertical turret lathe.

THE WATERLOO, CEDAR RAPIDS & NORTHERN will spend $300,000 during the next three months for equipment for its power plant at Waterloo, Iowa.

THE MINNEAPOLIS, ST. PAUL, ROCHESTER & DUBUQUE ELECTRIC TRACTION is asking bids through the J. G. White & Co., Inc., for 11 machine tools to be installed in its shops at Minneapolis.

THE ALASKA ENGINEERING COMMISSION has awarded to the Browning Company, Cleveland, Ohio, a contract for a locomotive crane to be used on the construction of the new Alaska railroad.

THE SEABOARD AIR LINE has ordered about $50,000 worth of machine tools to replace tools damaged in the recent fire at the Portsmouth, Va., shops. Work on the rebuilding of these shops has been commenced and it is expected that more machine tools will be purchased later.

THE MISSOURI, OKLAHOMA & GULF is inquiring through the Arnold Company of Chicago for five lathes, five grinders, three boring mills, two drills, two presses, a planer, a universal milling machine, a portable crane and hoist, a portable valve facing machine, portable valve setting rollers, a triple-head bolt cutter, a pipe-cutting and threading machine, a draw cut shaper, a bar shear, six portable vises, a 3,300-lb. steam hammer, a forging machine and bulldozer, 2-in. bolt header and forging machine, a pressure blower, a case-hardening and spring furnace, a 500-lb. belt-driven hammer, 12-ft. bending rolls and a 12-ft. flanging clamp.

Supply Trade News

The Baldwin Locomotive Works is reported to be negotiating for a large contract for war material.

Edward A. Hill, retired manufacturer of railway supplies, died April 29, at the home of John C. King in Chicago.

S. F. Klohs, mechanical engineer and draftsman, has moved his office from the Monadnock block, Chicago, to room 1309, Great Northern building.

John H. Lloyd, formerly assistant to the president of the Morgan Engineering Company, Alliance, Ohio, died recently in that city at the age of 56 years.

J. R. Wills, for eight years supervisor of signals of the Oregon Short Line at Ogden, Utah, has joined the sales force of the National Carbon Company, Cleveland, Ohio.

The Cast Steel Locomotive Ashpan Company, St. Louis, Mo., has been incorporated with a capital stock of $40,000 by H. M. Pflager, Arthur W. Morey and Fred W. Dieckmann.

H. S. Collette, secretary of J. G. White & Co., Inc., and the J. G. White Engineering Corporation, New York, has resigned from these companies and expects to reside permanently in California.

The Edgar Allen American Manganese Steel Company, Chicago, has changed its name to the American Manganese Steel Company. This company has foundries at Chicago Heights, Ill., and New Castle, Del.

The Louisville & Nashville has recently awarded a contract to the Roberts & Schaefer Company, Chicago, for the equipment of a large 500-ton, four-track reinforced concrete coaling station, for installation at Lexington, Ky.

It is reported that the Franklin, Pa., plants of the Chicago Pneumatic Tool Company will soon be put in operation day and night on an order for shells estimated up to 300,000 received from the Bethlehem Steel Corporation.

On and after May 1, the New York offices and show rooms of The Dahlstrom Metallic Door Company, Jamestown, N. Y., will be located on the fifth floor of the Consolidated Gas Company's building, 130 East Fifteenth street.

John H. Hall, 2 Rector street, New York City, has discontinued his practice as consulting engineer and has entered the employment of the Taylor-Wharton Iron & Steel Company, High Bridge, N. J., as metallurgical engineer.

The Pittsburgh Steel Car Company, Pittsburgh, Pa., has been incorporated at Dover, Del., with a capital of $100,000, and will manufacture and deal in steel railroad cars. The incorporators are Norman P. Coffin, Herbert E. Latter, Wilmington, Del., and Clement M. Enger, Elkton, Md.

In recognition of his services to the engineering profession, the Japanese government through its Department of Education has conferred upon J. A. L. Waddell, consulting engineer of Kansas City, Mo., the degree of Hakushi (Doctor of Engineering, the highest scholastic honor in its gift).

The Western Electric Company has recently shipped three boat loads of telephone poles to Greece. The shipment was made in 45 carloads from the concentration yard at Toledo, Ohio, and consisted of 15,000 4-in. top, 20 ft., and 2,000 5-in. top, 25 ft. Northern Cedar poles of first quality. The Greek Government will use the poles in extending present telephone facilities.

The Union Signal Construction Company, Pittsburgh, Pa., has been incorporated at Dover, Del., with a capital stock of $10,000, to manufacture, buy, sell and deal in all kinds of railroad supplies, including signal apparatus. W. D. Uptegraff, Pittsburgh, Pa.; T. W. Siemon and T. S. Grubbs, Edgewood, Pa., are the incorporators. Messrs. Uptegraff and Siemon are officers of the Union Switch & Signal Company.

The Westinghouse Electric & Manufacturing Company has received an order having an aggregate value of $27,500,000 from the British government for 1,000,000 rifles at $27.50 each. The con-

tract was placed through J. P. Morgan & Co. and it is understood that the rifles are being ordered for Russia. It is further reported that there is also an additional order for the same amount; and if the latter report be also true the total orders for rifles will total $55,000,000. The company has been working for some time on some smaller orders for shrapnel. The rifles are not to be made in the company's own plants, but in shops secured with that object in view. The plants will thus not be interfered with, but will be prepared to work on domestic orders for electrical equipment.

In the *Railway Age Gazette* of April 23 it was reported that the American Locomotive Company was supposed to have closed contracts with the Russian government for shrapnel aggregating $65,000,000 in value. Later reports have made it evident that the only company which has received orders for shrapnel from the Russian government is the Canadian Car & Foundry Company. That company closed a contract some time ago for approximately $83,000,000 worth of such material. The contract calls for more than 5,000,000 loaded shrapnel shells, the shot and shells to be shipped separately, and a considerable portion of it has been sublet to American and Canadian companies. The American Locomotive Company has, however, received an order for $68,000,000 worth of unloaded shrapnel shells; but this order has been received from Great Britain rather than from Russia. The company plans to fill about one-half the order at its Richmond and Dunkirk plants and has already purchased a large amount of the special machinery which will be required. The remainder of the order will be filled by the New York Air Brake Company and the Westinghouse Air Brake Company; and it is understood that the latter will divide a part of its share with the Union Switch & Signal Company.

Westinghouse Electric & Manufacturing Company

The directors of the Westinghouse Electric & Manufacturing Company at their meeting on Wednesday issued the following statement: "The company will not require additional capital for its present volume of business or for any increase expected in the near future. It has made adequate provision, without borrowing, for the execution of the large orders recently received from foreign governments. On the other hand, in case of the radical increase in business which may come with good times, the company would be handicapped in securing additional capital by the following restriction of the trust indenture under which its convertible bonds were issued, viz., the Electric Company will not issue additional stock and title to preference or priority over its assenting stock, nor distribute any capital stock by way of stock dividends, nor issue any capital stock at a price more than 10 per cent below the market price of the stock of the same class at the time the new stock is offered for subscription or sale.

"In order that the company may be in a position when the time comes, to raise additional capital by the sale of stock the following tentative plan has been approved. It is proposed to ask the bondholders to consent to the elimination of the above provision, and in consideration therefor to reduce the price at which common stock—formerly called assenting—may be issued for the bonds upon conversion from 200, the price now fixed by the agreement, to par for the balance of the present calendar year and thereafter 110.

"As an incident to this plan, in case it becomes operative, either common stock to the amount required for conversion under the proposed modification, or new bonds convertible into common stock at the reduced price, would be offered to the stockholders for pro rata subscription at 105, and to the extent that stocks or bonds are sold upon that basis the proceeds would be used in retiring present bonds at redemption price.

"Accordingly under the proposed plan bondholders would receive either (a) cash at the redemption price of 105 and accrued interest, or (b) par in new bonds convertible into common stock at the reduced price, or (c) part cash and part new bonds.

"An agreement providing for this plan is in course of preparation under which the Guaranty Trust Company will be depositary and Kuhn, Loeb & Company managers. It will rest with the managers to determine whether and when the plan shall become operative. A circular announcing the plan in its definite form will be issued shortly."

Railway Construction

BEAUMONT, LIBERTY & HOUSTON TRACTION.—Organized in Texas to build an interurban line from Houston, Tex., east to Beaumont, about 81 miles, also to build from Houston, southwest to Richmond, about 30 miles. E. Kennedy, Houston, and associates are back of the project.

CALIFORNIA SOUTHERN.—This company has awarded a contract to the Blythe Construction Company, Los Angeles, Cal., for the construction of a new 41-mile railroad from Blythe Junction and Blythe to the lower Palo Verde valley. Grading has been started on the 10-mile branch between Blythe Junction and Blythe. The company intends to buy rolling and motive power in about 90 days. J. M. Neeland, Los Angeles, Cal., is president, and G. W. Rice, Blythe Junction, Riverside county, Cal., is chief engineer.

CANADIAN ROADS.—Construction work, except ballasting on a section of about ten miles, has been finished on the line building from a point on the Grand Trunk Pacific to Indian Bay for the Greater Winnipeg Water District. This line, which is part of the improvements being carried out to provide a water supply for the city of Winnipeg, Man., from Shoal Lake, is expected to be open for operation soon, to carry contractors' supplies and necessary materials for aqueduct construction. A total of 102 miles of track, including spurs and sidings has been laid. S. H. Reynolds is chairman of the commissioners, Winnipeg, Man. (February 27, p. 451.)

CHICAGO, ROCK ISLAND & PACIFIC.—This company has resumed track elevation at Chicago, Ill., between Seventy-ninth and Eighty-seventh streets.

CUMBERLAND NORTHERN.—Surveys are now being made and bids will be asked for in about 30 days, to build from a connection with the Louisville & Nashville at Barbourville, Ky., north via either Fighting creek or Little Richland creek to the headquarters of Collins fork, and along Goose creek and south fork of Kentucky river to Manchester, about 25 miles. There will be a number of small bridges on the line. An extension is projected north about 30 miles to Beattyville, but this extension will not be built this year. The company expects to develop a traffic in coal, lumber, livestock and general merchandise. C. F. Heidrick, president; M. Posey, locating engineer, Barbourville. (See Kentucky Roads, April 23, p. 914.)

HAMPDEN RAILROAD.—Governor Walsh has allowed to become law without his signature the bill passed by the Massachusetts legislature extending to July 1, 1918, the time within which this company shall locate and complete its proposed branch lines to Holyoke and Chicopee Falls.

HIAWASSEE VALLEY.—Work is now under way by the Wright-Johnstone Contracting Company, Andrews, N. C., on the section from Andrews southwest via Peach Tree to Hayesville, 25 miles. The grading work is about 75 per cent finished. It is expected that the line will be leased and that the lessee will furnish the rails and the rolling stock. The company was organized in 1913, to build a 35-mile line from Andrews, N. C., southwest via Peach Tree to Hiawassee, 35 miles. O. L. Anderson, president, and F. Cloud, chief engineer. H. S. Kinnebrew, Andrews, N. C., is in charge of the work. (October 31, p. 818.)

MIDLAND RAILWAY.—Application has been made for a charter in Georgia by this company, with a capital of $1,000,000, it is said, to build a line from Savannah, northwest to Milledgeville, about 150 miles, also to build branch lines to other points. W. M. Exley, W. H. Webb, L. M. Mikel, K. I. Helmey and C. A. Johnson of Effingham county; J. A. Davis of Burke county, and H. O. Burman of Chatham county, are said to be interested.

TEXAS ROADS.—Plans are being made to build a line from Lamesa, Tex., south to Midland, about 55 miles. Residents of Midland have been asked to raise a bonus of $250,000 in aid of the project. F. J. O'Donnell, Sweetwater, and W. L. Carwile, Dallas, are the promoters.

WYOMING-MONTANA.—This company has been incorporated at Sheridan, Wyo., with a capital stock of $2,000,000 and proposes

to construct a railroad from Sheridan, Wyo., to Beaver Hills and Big Horn. George Forsyth, Olaf Nelson and D. P. B. Marshall are the incorporators.

RAILWAY STRUCTURES

Beacon, N. Y.—The New York Central has given a contract to John Thatcher & Sons, Brooklyn, N. Y., for building a new passenger station at Beacon, to include a main building 49 ft. by 65 ft., and a baggage room 31 ft. by 42 ft. The contract calls for the construction of the station superstructure and wooden platforms and canopies. The sub-structure is already in place. The new station will be of red brick construction on a rough face concrete base up to the window sills, and the exterior brick walls will be of rough texture. The roof over the main building will be of red tile, and on extensions of slag. The subway now in place will connect the passenger station with inter-track platforms.

Buffalo, N. Y.—The Lehigh Valley has awarded to J. Henry Miller, Incorporated, Baltimore, Md., the first contract for construction work in connection with the new freight and passenger terminal to be built at Buffalo. This contract covers some of the important building work in connection with the new freight and passenger stations proper and, with the incidental work attached to it, will amount to $750,000. The passenger station, which will be built of Indiana limestone, will face main street, extending from Quay to Scott streets. A tunnel will extend under Washington street, in the rear, reaching the head house, platforms and tracks. The site for the passenger station proper has already been cleared. The freight terminal will be located south and east of Scott and Washington streets, and this site also is being prepared for the beginning of construction work.

Bids are wanted, May 15, by Edward B. Guthrie, chief engineer of the Buffalo Grade Crossing Commission, Buffalo, for the excavation and masonry work for two bridges at Lord and Smith streets, where the streets are to be carried under the Pennsylvania Railroad tracks. The superstructures are to be built by the Pennsylvania Railroad. Bids for the masonry and steel for a bridge over the Pennsylvania Railroad at Bailey avenue will probably be received about two weeks later. In addition the Lehigh Valley and the Delaware, Lackawanna & Western will build bridges in connection with the other Bailey avenue work.

Chicago, Ill.—The New York, Chicago & St. Louis has awarded a contract to the Pennsylvania Steel Company for a bridge of 5 spans over the Illinois Central tracks at Seventy-ninth street, Chicago, to be completed November 1, 1915. This bridge comprises about 2,000 tons of steel and completes the grade elimination work of this company under the 1909 ordinance.

The contract for the foundation work for the Pennsylvania Lines' new freight terminal at Chicago was let to the Glones-Sinek Company, Chicago, instead of to the Sumner-Sollitt Company, as was previously reported in these columns. (April 30, p. 955.)

The Union Station Company has asked for bids for the construction of sewers and retaining and curb walls in connection with the work on the new Union Station.

Matawan, N. J.—Bids will be asked for about June 15 by the Board of Chosen Freeholders, Matawan, for a Strauss bascule trunnion bridge to be built over Matawan creek, at a cost of about $40,000. The new structure will carry tracks for the operation of the Jersey Central Traction Company's cars, and this company will pay one-half of the cost of the new bridge.

Philadelphia, Pa.—A bill has been introduced in the Pennsylvania legislature calling for an appropriation of $15,000, to make plans and select the site of a bridge, to be built over the Delaware river, between the cities of Philadelphia and Camden, N. J. It is understood that the proposed structure, which is to be known as the William Penn Memorial Bridge, will carry tracks for the operation of street railway cars.

Portsmouth, Va.—An officer of the Seaboard Air Line writes regarding the report that contracts have been let to build a temporary shop building at Portsmouth; that the company has arranged for a temporary cover on a portion of the burnt shop area, but no decision has yet been reached for the construction of a permanent building.

Railway Financial News

Chicago, Rock Island & Pacific.—The Sheldon proxy committee, which voted for the election of W. Emlen Roosevelt, Charles Hayden and William J. Matheson as directors at the last annual meeting, has issued a circular, which says in part: "Now that the court has taken possession of the property, the committee deems it essential to stockholders that they should be free to adopt for their protection other agencies with fuller powers. The committee, therefore, surrenders all rights granted to it and especially the right to vote at the regular annual meeting next October." The committee says that it was not informed that the railway company was to be put in the hands of a receiver.

A committee has been formed to protect the interests of the holders of the $20,000,000 20-year 5 per cent debentures. This committee is composed of Seward Prosser, president of the Bankers' Trust Company; E. K. Boisot, A. Barton Hepburn, Edwin G. Merrill and James Speyer.

Kansas City, Mexico & Orient.—William Volker has filed a petition asking for the appointment of a receiver for the Kansas City, Mexico & Orient, claiming that the reorganization committee and the United States & Mexican Trust Company are not carrying out the terms under which the road was reorganized.

Missouri, Kansas & Texas.—About 90 per cent of the $7,000,000 notes due May 1 have been deposited for extension.

Pennsylvania Railroad.—Kuhn, Loeb & Co., New York, have bought from the Pennsylvania $65,000,000 general mortgage 4½ per cent bonds. It is understood that the offering price to the public will be between 98 and 98½. The proceeds from the sale will be used along with the proceeds of the $49,000,000 first mortgage bonds recently sold to pay at maturity the $86,827,000 3½ per cent convertible bonds due October 1.

Wabash.—An abstract of the reorganization plan and editorial comments thereon are published elsewhere in this issue.

Railway in Argentina Leased.—The Compañia General de Ferrocarriles de la Provincia de Buenos Aires has contracted a seven year lease of the 25-mile section of the Rosario to Mendoza Railway, running from Rosario to Fuentes.

Economics of Electric Signal Operation.—Density of traffic enters into the question of the selection of the type of apparatus for block and interlocking signals. Where traffic is very dense, quick operation of the signals is desirable in order that trains may follow each other without having to wait for a signal to clear. In such situations also, it is usually out of the question to distribute storage batteries easily, and consequently, if they are used they must be stationary and be charged over a line from a central point. This method quickly becomes uneconomical when low voltages are desirable, or necessary, owing to the large loss of energy in transmission, for the potential cannot be higher than that needed to charge the batteries. With alternating current the potential may be made as high as desired, and the transmission losses cut down. Yet even under very unfavorable conditions stationary storage battery may be the most desirable means of operating a signal system. This is especially true where reliability, at a reasonable cost, is chiefly to be desired. The storage battery may be made of such capacity that it will operate the system for any given time without the necessity for recharging, so that should the line fail, there would be no interruption of signal operation. This is not possible with alternating current apparatus. Storage batteries occupy less space than primary batteries of the same capacity, and need less attention in the way of renewals. It is not necessary, except at rare intervals, to transport heavy supplies to be used in storage battery maintenance, whereas this must be done every time a primary battery is renewed. Storage batteries, however, need the attention of the maintainer every time they are charged, and this occurs much more frequently than the renewal of primary battery.—*W. H. Arkenburgh.*